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# In the Supreme Court of the United States

OCTOBER TERM, 1997

MARCHON EYEWEAR, INC., ET AL., PETITIONERS,

*v.*

TURA LP AND BRODART CO., RESPONDENTS.

**Petition for a Writ of Certiorari to the United States Court of Appeals for the Federal Circuit**

## PETITION FOR A WRIT OF CERTIORARI

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## QUESTION PRESENTED

Federal law requires that patent claims be drafted in terms that are comprehensible to a "person skilled in the art" relevant to the patent. 35 U.S.C. § 112, ¶ 1. In *Markman* v. *Westview Instruments, Inc.*, 116 S. Ct. 1384 (1996), this Court held that the construction of patent claims is a matter for the court rather than the jury. The decision in *Markman* did not address the respective roles of the trial and appellate courts in claim construction and did not determine what standard of appellate review applied to district court determinations made in the course of claim construction.

This case presents the following question:

When a district court makes a fact finding, based on the evidence at trial, of what a technical patent term meant to a person skilled in the relevant art at the time of the invention, may the Federal Circuit set aside that finding without holding it clearly erroneous?

## PARTIES TO THE PROCEEDING

In addition to the parties listed in the caption, Marcolin U.S.A., Inc., Rothandberg, Inc., and CVI/Beta Ventures, Inc., are petitioners.

## RULE 29.6 STATEMENT

Petitioners Marchon Eyewear, Inc., and CVI/Beta Ventures, Inc., have no parent companies or non-wholly owned subsidiaries. The parent company of petitioner Marcolin U.S.A., Inc., is Marcolin S.p.A.; Marcolin U.S.A., Inc., has no non-wholly owned subsidiaries. Petitioner Rothandberg, Inc., does not have a parent company; its wholly owned subsidiary, RB Mexico, Inc., has one non-wholly owned subsidiary: Corporacion Optica Internacional, S.A. de C.V.

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## PETITION FOR A WRIT OF CERTIORARI

Marchon Eyewear, Inc., Marcolin U.S.A., Inc., Rothandberg, Inc., and CVI/Beta Ventures, Inc., respectfully petition for a writ of certiorari to review the judgment of the United States Court of Appeals for the Federal Circuit in this case.

## OPINIONS BELOW

The opinion of the court of appeals (App., *infra*, 1a-31a) is reported at 112 F.3d 1146. The order of the court of appeals denying rehearing (App., *infra*, 110a-114a) is reported at 120 F.3d 1260. The order of the court of appeals denying leave to supplement the record (App., *infra*, 32a-36a) is unreported. The opinion of the district court (App., *infra*, 39a-109a) is reported at 905 F. Supp. 1171.

## JURISDICTION

The judgment of the court of appeals was entered on May 1, 1997. A timely petition for rehearing was denied on August 13, 1997. On October 28, 1997, the Chief Justice extended the time to file the petition for a writ of certiorari to and including November 25, 1997. The jurisdiction of this Court is invoked under 28 U.S.C. § 1254(1).

## STATUTE AND RULE INVOLVED

35 U.S.C. § 112 provides in pertinent part:

> [¶ 1] The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.
>
> [¶ 2] The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Rule 52(a) of the Federal Rules of Civil Procedure provides in pertinent part:

> Findings of fact, whether based on oral or documentary evidence, shall not be set aside unless clearly erroneous, and due regard shall be given to the opportunity of the trial court to judge of the credibility of the witnesses.

## STATEMENT

This case presents a fundamental question of enormous practical importance to the administration of the patent laws. Patents must be drafted in "terms" that are comprehensible to a "person skilled in the art." 35 U.S.C. § 112, ¶ 1. At issue here is the standard of appellate review that applies to a district court's determination from all the evidence of what a claim term means to such a person. As Judge Mayer's dissent from the denial of rehearing en banc makes clear, the Federal Circuit is deeply divided on the question whether to review those determinations *de novo* or only for clear error.

### A. The Patents

1. When a conventional metal eyeglass frame is twisted or bent, it breaks, kinks, permanently deforms, or loses its fit. Robert Zider and John Krumme invented a soft, springy eyeglass frame made of a "nickel-titanium based shape-memory alloy" that resumes its original shape, either spontaneously or after warming to room temperature, after being deformed. See App., *infra*, 4a. They received United States Patent No. 4,772,112 (the '112 patent) for this invention in 1988; two years later, they received Patent No. 4,896,955 (the '955 patent), a continuation-in-part of the '112 patent. See *id.* at 4a.

The written specification and drawing are the heart of a patent. See 35 U.S.C. §§ 112, 113, 154(a)(4). The specification must contain a "written description of the invention, and of the manner and process of making and using it," in terms that "enable any person skilled in the art" to understand what the invention is and how to "make and use" it. *Id.* § 112, ¶ 1. The

specification must "conclude with one or more claims * * * distinctly" identifying the advance on prior art that warrants and receives the protection of the patent laws. *Id.* § 112, ¶ 2. The claims define the scope of the patent grant. *Markman* v. *Westview Instruments, Inc.*, 116 S. Ct. 1384, 1388 (1996).

The principal claims in each of the Zider/Krumme patents describe an "eyeglass frame having at least a portion thereof fabricated from nickel-titanium based shape-memory alloy" with additional properties. App., *infra*, 5a-6a. Claim 1 of the '955 patent describes a nickel-titanium portion

> in the work-hardened pseudo-elastic metallurgical state, said portion having been subjected to work-hardening and having a low effective elastic modulus giving a soft, springy feel, said portion having a greater than 3% elasticity over a temperature range from -20° C. to +40° C.

*Id.* at 5a. Claim 1 of the '112 patent is similar but refers to 4% rather than 3% elasticity, and differs in other respects not relevant here. *Id.* at 6a.

Claim 5 of both patents covers a frame of which the nickel-titanium part has been subjected to work-hardening and heat-treatment and that has "a minimum of 3% heat-recoverable shape-memory, a yield strength greater than 30,000 psi and at least 3% elasticity." App., *infra*, 5a. Claim 5 of the '112 patent specifies different degrees of work-hardening. *Id.* at 6a.

2. Zider and Krumme assigned their patent rights to CVI/Beta Ventures, Inc. (see App., *infra*, 40a) which contacted two competing concerns, petitioner Marchon Eyewear and respondent Tura LP, to determine their interest in taking licenses for the patented flexible frames. C.A. App. 3153-3163. On behalf of itself and petitioners Marcolin U.S.A., Inc. and Rothandberg, Inc. (collectively "Marchon"), Marchon purchased an exclusive license to import and sell a line of frames covered by the patents. See *id.* at 3163. By 1995, Marchon's annual sales of those frames approached $50 million. See *CVI/Beta Ven-*

*tures, Inc.* v. *Custom Optical Frames, Inc.*, 893 F. Supp. 508, 516 (D. Md. 1995), aff'd mem., 92 F.3d 1203 (Fed. Cir. 1996).

Tura took a different approach. Although it was well aware of the '112 and '955 patents, Tura marketed similar nickel-titanium-based frames without obtaining a license from CVI/Beta. C.A. App. 3158-3166. Tura then tried to invalidate the '955 patent in a reexamination proceeding in the PTO. App., *infra*, 16a. That proceeding addressed whether experiments published in the "Mercier article" anticipated the Zider/Krumme invention, rendering the later invention unpatentable. See 35 U.S.C. §§ 102-103. Because the Mercier article described a "different alloy" and exhibited the desired properties "in a temperature range outside that limited by the claim" of the patent (and useless for eyeglass frames), the PTO affirmed the patent's validity. See App., *infra*, 19a-20a.

**B. Proceedings Below**

1. When Tura continued to sell flexible nickel-titanium frames, CVI/Beta sued Tura and others in the Eastern District of Virginia for patent infringement. The district court, which had original jurisdiction under 28 U.S.C. § 1338(a), transferred the action to the Eastern District of New York. Marchon and the other petitioners intervened as plaintiffs.

Tura's principal defense was that its frames did not infringe because the metal they used did not "meet the elasticity requirements of the patent claims." App., *infra*, 41a. That defense depended on a narrow definition of the term "3% elasticity" in Claims 1 and 5 of the patents. Under Tura's definition, "3% elasticity" meant "that a metal item [would] return precisely to its original shape after being strained by at least 3% of its original length." *Id.* at 44a. (A strain of 3% would bend an eyeglass frame to an angle of about 160°. See *id.* at 121a-122a (C.A. App. 7233, 7236).) Under petitioners' definition, "3% elasticity" meant that the item would recover from a stretch of, say, 3.5% "to the extent of at least some increment greater than"

3%. It need not, however, fully" and spontaneously "recover to" its original length. *Id.* at 10a.

At trial in late 1994, the parties presented their competing claim interpretations to the jury, common practice at the time. App., *infra*, 8a. The jury reached a verdict for petitioners. While Tura's motion for judgment as a matter of law was pending, however, the Federal Circuit decided that only courts should construe patent claims. See *Markman* v. *Westview Instruments, Inc.*, 52 F.3d 967 (1995) (en banc), aff'd, 116 S. Ct. 1384 (1996). In conformity with *Markman*, the district court then construed the patent claims itself. Like the jury, the court determined that petitioners' construction was the correct one.

The district court observed that it had had "the opportunity to review the specifications and prosecution history at great length" and "to hear testimony from experts about the meaning of technical terms," specifically "including elasticity." App., *infra*, 45a. Based on that extensive education about the meaning of the term to persons "skilled in the art," the court agreed with Marchon that "the term 3% elasticity * * * refer[s] to the behavior exhibited by a component which, when strained by a deforming force to a length in excess of 3% of its original length, springs back by at least 3% of its original length when the force is released." *Id.* at 57a.

The district court noted that "the real issue of claim interpretation presented by this case is not the meaning of elasticity in the abstract, but rather the meaning of a measure of elasticity expressed as a percentage." App., *infra*, 47a. The claims themselves "use[d] the term[ ] 3% elasticity * * * without elaboration." *Id.* at 46a.

Because the patents involved "scientific principles" and "technical terms," the district court considered expert testimony "about the meaning of the term 3% elasticity" as understood by "one of ordinary skill in the art." App., *infra*, 56a-57a. See 35 U.S.C. § 112, ¶ 1. Dr. Daniel Beshers, a professor of metallurgy and material science at Columbia University, offered the *only*

evidence directly on point. Tura presented no evidence on the meaning of "elasticity" expressed as a percentage. Tura's expert testified only that there are "as many definitions of elasticity as there are metallurgists." App., *infra*, 57a n.11.

Dr. Beshers testified that "elasticity expressed as a percentage, particularly when discussing shape memory alloys, is widely understood to refer to the ability of a component to 'spring back' upon the release of stress to a degree indicated by the percentage of elasticity stated." App., *infra*, 56a. See *id.* at 46a-47a.[1] That evidence of the normal understanding of "elasticity" expressed as a percentage was consistent with the usages in the patent documents.

The district court noted that two figures in the patent specifications, 2F and 2H, depicted a return to original length after being stressed about 6%, but were not identified as exhibiting "6% elasticity." App., *infra*, 49a. See *id.* at 13a (reproducing figures). To the contrary, the specifications stated that those figures showed a component that acted "*completely elastically* up to strains of 6% or more." *Id.* at 49a (quoting specifications) (emphasis by court). Another passage of the specifications referred to "complete elastic spring back." *Ibid.* The district court concluded that, to be read as Tura contended, the claims would have to have "requir[ed] that a component behave 'completely elastically'" up to strains of 3% or more. *Ibid.*

Moreover, the district court observed that the specifications *did* use the exact phrase "3% elasticity" in describing another stress-strain graph, Figure 2G, that illustrated Claim 5's "minimum of 3% heat-recoverable shape-memory * * * and at least 3% elasticity." App., *infra*, 50a. See *id.* at 13a (reproducing figure). But that usage of "3% elasticity" required only a *partial*

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[1] Dr. Beshers' testimony was supported by the definition of "elasticity" in the CONDENSED CHEMICAL DICTIONARY (10th ed. 1981): "the ability of a material to recover its original shape *partially or completely* after the deforming force has been removed." C.A. App. 4208 (emphasis added).

elastic return toward the original shape after a strain of *6%*. *Id.* at 50a. The specifications described Figure 2G as exhibiting "3% elasticity" plus "3% heat-recoverable shape-memory" in response to a strain of 6%. *Ibid.* Thus, the "3% elasticity" left a non-permanent 3% deformation, but warming would cause the component to recover its original shape fully. *Ibid.*

In addition, the specification of the '955 patent discussed a component subjected to a 7.5% strain, which was completely recovered when "the component gives 3.7% elastic spring back and imparts 3.8% shape memory recovery when heated." App., *infra*, 50a. That behavior, the specification explained, shows "a minimum of 3% heat-recoverable shape-memory * * * and at least 3% elasticity." *Ibid.* The district court rejected Tura's suggestion that the elasticity and heat-recoverable shape-memory in claim 5 *each* were required *independently* to return a strained component completely to its original shape.

In the prosecution history as well, when the inventors described a complete return to original shape after a strain, they used the term "totally elastic," or characterized the behavior as a "spontaneous[ ] return to zero." App., *infra*, 54a. The district court observed that "[t]he only discussion of elasticity expressed in percentage terms * * * supports [petitioners'] definition of the term 3% elasticity." *Ibid.* That discussion occurred during the reexamination proceeding, when the inventors responded to a graph in the Mercier article that illustrated an alloy that had been strained to 11.1%, but had recovered only 8.1% after the deforming force was released. *Id.* at 54a-55a. The inventors characterized this as "illustrating *8.1% elasticity* at the expense of a 3% retained strain." *Id.* at 55a (emphasis added). Here, too, the use of a percentage to modify "elasticity" described spring-back that did not result in complete recovery.

In sum, based on the patent claim, specification, prosecution history, and evidence as to the understanding of a "person skilled in the art," the district court found that the jury applied the correct claim construction in reaching its verdict and,

rejecting Tura's other arguments, denied Tura's motion for judgment as a matter of law. App., *infra*, 57a-84a. The court entered judgment for Marchon for $12.5 million and for CVI/Beta for $800,000 in damages and permanently enjoined Tura from further infringement. App., *infra*, 105a-109a.

2. Before the district court issued its decision, Marchon obtained a preliminary injunction against a Maryland company, Custom Optical Frames, that began importing flexible nickel-titanium frames in early 1994. See *CVI/Beta Ventures, Inc.* v. *Custom Optical Frames, Inc.*, 893 F. Supp. 508, 513 (D. Md. 1995), aff'd mem., 92 F.3d 1203 (Fed. Cir. 1996) (reprinted at App., *infra*, 115a-120a). Like Tura, Custom Optical asserted that the claim element of "greater than 3% elasticity" required "that the frame portion show complete recovery, *i.e.*, a return to origin, after a strain greater than 3%." *Id.* at 521, 523.

Like the district court below, the district court in *Custom Optical* rejected that definition of "3% elasticity." The *Custom Optical* court noted that the specification described the frames in the invention as "highly" rather than totally "resistant to permanent deformation," suggesting that complete recovery was not a *sine qua non* of the claims. 893 F. Supp. at 522. The *Custom Optical* court also noted the consistent use of a percentage modifier when a combination of spontaneous spring-back and shape-memory resulted in shape recovery. *Ibid.*

The Federal Circuit affirmed the *Custom Optical* injunction in a nonprecedential opinion. In rejecting Custom Optical's narrow definition of "3% elasticity," the court of appeals observed that "*[n]owhere* in the specification, claims, or prosecution history" was there *any* indication "limiting the claim to complete recovery." App., *infra*, 118a (emphasis added). "To the contrary," the court continued, "where the phrase 'elasticity' is used, it is *not* in the context of complete recovery." *Ibid.* (referring to Fig. 2G) (emphasis added). The court of appeals also noted that Figures 2F and 2H were "described in the specification" only "as representing *ideal* characteristics." *Ibid.*

(emphasis added). Because the evidence then before the court — the "specification, claims, [and] prosecution history" — did not support the narrow definition of "3% elasticity," the Federal Circuit upheld the injunction.

3. On appeal in the present case, however, the Federal Circuit completely changed its tune. This time, "[h]aving reviewed the patent specifications and the prosecution histories," the court of appeals held that the claims meant exactly the opposite: that the "elasticity limitations of independent claims 1 and 5 of the '112 and '955 patents require full recovery after the release of stress." App., *infra*, 20a, 31a. *The Federal Circuit found its own definition of "3% elasticity" without taking into account the unrebutted evidence of the meaning of that term to persons "skilled in the art."* In the Federal Circuit's view, in this case "reliance on extrinsic evidence (*e.g.*, expert testimony) is not necessary." *Id.* at 20a n.6.

The Federal Circuit agreed with the district court that "[t]he claims of the '112 and '955 patents do not define" the term "3% elasticity." App., *infra*, 13a. The court of appeals held, however, that use of the terms "completely elastically" and "complete elastic spring back at room temperature" to describe figures 2F and 2H linked the term "elasticity" to the concept of *total* recovery even though the claims replaced the adverbs indicating totality with small percentage values. *Id.* at 14a.

The Federal Circuit stated that the patent itself provides the best indication of what a term means and that "the patent drawings are highly relevant in construing the elasticity limitations." App., *infra*, 12a. But when the text of the patent and its drawings conflicted with the Federal Circuit's construction, the court simply changed the patent to fit its construction by announcing that the specification "contains a typographical error." *Id.* at 13a n.5. The specification for the '112 patent clearly illustrated a combination of *partial* spring-back (*i.e.*, "3% elasticity") and shape-memory (*i.e.*, "3% heat-recoverable shape-memory") with a reference to Figure **2G**, which showed

exactly that phenomenon. See *id.* at 13a. Confronted with that difficulty, the court modified the patent by fiat to make the reference read "**2F**" instead, asserting that a "typographical error" was "clear from the context." *Id.* at 13a n.5. The court of appeals did not offer any support for this extraordinary, *ad hoc* amendment of the patent specification, nor did it explain why this "typographical error" was not among the 29 typographical errors listed in the certificate of correction filed for the '112 patent in 1990 (Pl. Trial Ex. 1).[2]

The Federal Circuit also found "compelling" what it viewed as a "clear[]" and specific definition of "3% elasticity" advanced in the reexamination. App., *infra*, 22a-23a. CVI/Beta had stated that one "sample" of the different alloy in the Mercier experiments "clearly does not exhibit * * * properties" that CVI/Beta described as "*totally* elastic." *Id.* at 18a (emphasis added). Elsewhere, CVI/Beta had observed that "[t]he 8.1% elasticity shown in Figure 4 of Mercier comes at the expense of a 3% strain," an entirely unrecoverable deformation that would be too great to be of use in eyeglass frames. *Ibid.*

The district court had concluded that this use of "elasticity" in percentage terms to include less than full recovery was consistent with the evidence of the meaning of "3% elasticity" to one skilled in the art. See p. 7, *supra*. The Federal Circuit, however, disregarded the actual usage of "elasticity" in percentage terms in favor of a judicial paraphrase; the court then concluded that the *paraphrase* committed CVI/Beta to a definition of "3% elasticity" that requires full, spontaneous return to the original shape. *Id.* at 22a-23a.

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[2] Because this issue had not been raised at trial, Marchon immediately moved to supplement the record with evidence that there was in fact no error in the patent as published. The Federal Circuit denied this motion in an unpublished order. App., *infra*, 32a-36a.

Finding that no reasonable jury could have found that Tura had infringed the reinterpreted patents, the Federal Circuit ordered entry of judgment of noninfringement. App., *infra*, 31a.

4. The Federal Circuit denied rehearing and rehearing en banc. App., *infra*, 111a. Judge Mayer dissented from the denial of rehearing en banc. *Id.* at 111a-114a.

Judge Mayer chided his colleagues for "amass[ing] decisionmaking authority without due deference to other actors in the process." App., *infra*, 111a. He observed that the Supreme Court "chose not to reaffirm" the Federal Circuit's reasoning in *Markman*, which had characterized claim construction as a pure question of law. *Ibid.* "Instead," this Court "divided the responsibilities for claim construction between actors according to well-established principles," giving "the trial judge the task of interpreting the scope of the patent by examining the claims, the specification, the prosecution history, and extrinsic evidence." *Id.* at 111a-112a.

In particular, Judge Mayer observed, this Court assigned to "the trial level fact finder * * * the task of evaluating extrinsic evidence to determine the scope and content of prior art and what a claim term would mean to one of ordinary skill in that art." App., *infra*, 112a. This Court's opinion nowhere suggested "that, where the district court found facts about * * * the skill and understanding of an artisan, the appellate panel could disregard these findings upon *de novo* review." *Ibid.*

In Judge Mayer's view, when the court of appeals "must review determinations of law that are informed by the resolution of factual disputes, [it] must separate the two and give each its proper measure of respect," reviewing *de novo* only legal conclusions. App., *infra*, 113a. "Save to augment the power of our court, no rational basis exists to deviate from every other area of appellate review, in which we examine the factual findings of a district court only for clear error," which was "the review contemplated by" this Court in *Markman*. *Id.* at 113a-114a.

## REASONS FOR GRANTING THE PETITION

For good reason, the legal press has paid close attention to the decisions in this case.[3] Claim construction often is the dispositive issue in a patent infringement case, as it was here. See, *e.g.*, *Eastman Kodak Co.* v. *Goodyear Tire & Rubber Co.*, 114 F.3d 1547, 1552 (Fed. Cir. 1997). Because extrinsic evidence about the technical meaning of patent terms is necessary to understand a host of highly technical patents,[4] the allocation of duties between trial and appellate courts in the construction of patent claims according to the understanding of one "skilled in the art" (35 U.S.C. § 112, ¶ 1) is of overwhelming importance to patent owners and to patent jurisprudence.

In *Markman* v. *Westview Instruments, Inc.*, 116 S. Ct. 1384 (1996), this Court held that "the construction of a patent, including terms of art within its claim, is exclusively within the province of the court." *Id.* at 1387. Well aware that "construing a term of art following receipt of evidence" is "a mongrel practice" mixing ultimate questions of law with antecedent questions of fact (*id.* at 1390), the Court eschewed a global "law/fact distinction" in favor of an analysis focusing on the precedent and policies that supported simply "classifying the question as one for the court." *Id.* at 1393 n.10.

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[3] See Fram & Mitchell, *Federal Circuit Sees Fit To Streamline Litigation*, NAT'L L.J., Oct. 20, 1997, at C25, C28; *Judge Mayer Suggests Discovery and Testimony for Appeals of Claim Construction*, 54 PAT., TRADEMARK & COPYRIGHT J. (BNA) 347 (1997); *Federal Circuit Denies Reconsideration of Ruling Vacating Infringement Finding*, MEALEY'S LITIG. REP.: INTELL. PROP., Sept. 8, 1997, at 11; *Patents: Claims to Shape-Memory Eyeglasses Cover Only Full Recovery of Shape*, 54 PAT., TRADEMARK & COPYRIGHT J. (BNA) 31 (1997); *Federal Circuit Finds Court Misconstrued Claims, Vacates Infringement Ruling*, MEALEY'S LITIG. REP.: INTELL. PROP., May 19, 1997, at 14.

[4] See, *e.g.*, Poissant & Rabinowitz, *Post-'Markman' Cases Vary Claim Construction*, NAT'L L.J., Oct. 20, 1997, at C29 (biotechnology patents). See also No. 95-26, Br. of Fed. Cir. Bar Ass'n 3.

This case presents an important question of patent law that this Court did not resolve in *Markman*. That case allocated responsibility between *court* and *jury* in the trial of an infringement case, holding that "judges, not juries, are the better suited to find the acquired meaning of patent terms." 116 S. Ct. at 1395. The Court did not explicitly address the allocation of responsibility between *trial* courts and *appellate* courts in finding what claim terms mean to "person[s] skilled in the art." Leading commentators have observed that "[i]t is not yet clear" how *Markman* affects "the distinction of law and fact made for the purpose of determining the proper standard of appellate review." 9A C. WRIGHT & A. MILLER, FEDERAL PRACTICE & PROCEDURE: CIVIL 2D § 2591, at 103 (1997 supp.). As the decision in this case demonstrates, most of the Federal Circuit continues to adhere to that court's *Markman* opinion which, unlike the opinion of this Court, equated *all* determinations by a judge with issues of law that are reviewable *de novo* on appeal.

But "[w]hat seems clear to a judge may read otherwise to a skilled designer. That is why we had a trial." *In re Mahurkar Double Lumen Hemodialysis Catheter Patent Litigation*, 831 F. Supp. 1354, 1359 (N.D. Ill. 1993), aff'd, 71 F.3d 1573 (Fed. Cir. 1995). That observation of Judge Frank Easterbrook, who was trying a patent case while sitting by designation, concisely shows why the decision below is wrong, and why the issue presented warrants review by this Court. The Federal Circuit has made *irrelevant* both the meaning of claim terms to *"person[s] skilled in the art"* (rather than to judges) and the district court's determination of that meaning based on all the evidence at trial.

By contrast, this Court has recognized repeatedly that the scientific and technical aspects of patents make proper understanding of the terms of art essential. This Court also has recognized, most recently in *Markman*, 116 S. Ct. at 1394-1395, that evidence outside the patent and the prosecution history is often necessary to define terms as they would be known to persons skilled in the relevant art. See also, *e.g.*, *U.S.*

*Industrial Chemicals, Inc.* v. *Carbide & Carbon Chemicals Corp*, 315 U.S. 668, 678 (1942). As this Court long ago observed, a court that attempts to decide "the[ ] often recondite and difficult questions" presented by patent claim construction, while disdaining "the aid of scientific persons familiar with the subjects of the inventions in question," risks "be[ing] led" by advocates "into irremediable errors." *Bischoff* v. *Wethered*, 76 U.S. (9 Wall.) 812, 814 (1870).

Nonetheless, the Federal Circuit has transformed claim construction into an antiseptic exercise that disregards trial court findings of the meaning of claim terms to persons skilled in the relevant art, in favor of abstract exegesis by appellate judges. That approach conflicts with this Court's precedents and creates unnecessary uncertainty about the scope of patents.

As Judge Mayer's dissent reflects, this issue has generated a chronic and irreconcilable conflict within the Federal Circuit. Some judges freely engage in *de novo* term definition and entirely disregard district court findings, based on expert testimony and other evidence, that establish the baseline understanding of claim terms by persons skilled in the relevant art. Other judges review only for clear error district court findings of what claim *terms* mean to one "skilled in the art," viewing them as factual determinations that are antecedent to the legal construction of patent *claims*.

The resolution of this question is necessary to the orderly, predictable and accurate administration of the patent laws. The scope of a valuable patent should not depend upon the preferences of the judges selected to sit on a Federal Circuit panel. Further review is therefore warranted.

## I. THE DECISION OF THE FEDERAL CIRCUIT CONFLICTS WITH DECISIONS OF THIS COURT ON AN IMPORTANT AND RECURRING ISSUE

When a Federal Circuit doctrine conflicts with precedent and common sense, this Court has not hesitated to intervene to

correct that court. See, *e.g.*, *Cardinal Chemical Co.* v. *Morton International, Inc.*, 508 U.S. 83 (1993). In the mere *two and one-half years* since the en banc decision in *Markman*, at least *14 published decisions* have explicitly involved appellate review of a district court's use of extrinsic evidence to divine what patent terms mean to persons skilled in the relevant art.[5] The decision below manifestly applied the wrong standard of review. This case therefore falls within the narrow category warranting further review by this Court.

Although this Court intended its decision in *Markman* to increase the predictability of patent claim construction (see 116 S. Ct. at 1396), the Federal Circuit's sweeping *de novo* review, untethered to the pertinent science, has produced the opposite result. See Fram & Mitchell, *supra*, at C28. When the understanding of persons skilled in the relevant art becomes irrelevant to the interpretation of patent claims, claim construction depends entirely on the predilections of an appellate panel. And

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[5] *Endress + Hauser, Inc.* v. *Hawk Measurement Systems Pty. Ltd.*, 122 F.3d 1040, 1042 (Fed. Cir. 1997); *Regents of the University of California* v. *Eli Lilly & Co.*, 119 F.3d 1559, 1571-1573 (Fed. Cir. 1997); *Eastman Kodak Co.* v. *Goodyear Tire & Rubber Co.*, 114 F.3d 1547, 1555-1556 (Fed. Cir. 1997); *CVI/Beta Ventures, Inc.* v. *Tura LP*, 112 F.3d 1146 (Fed. Cir. 1997); *J.T. Eaton & Co.* v. *Atlantic Paste & Glue Co.*, 106 F.3d 1563, 1568-1570 (Fed. Cir. 1997); *Applied Materials, Inc.* v. *Advanced Semiconductor Materials America, Inc.*, 98 F.3d 1563, 1572 (Fed. Cir. 1996), cert. denied, 117 S. CT.. 1822 (1997); *Vitronics Corp.* v. *Conceptronic, Inc.*, 90 F.3d 1576, 1581-1585 (Fed. Cir. 1996); *Bio-Technology General Corp.* v. *Genentech, Inc.*, 80 F.3d 1553, 1559 (Fed. Cir. 1996), cert. denied, 117 S. Ct. 274 (1996); *Hoechst Celanese Corp.* v. *BP Chemicals Ltd.*, 78 F.3d 1575, 1579-1580 (Fed. Cir. 1996), cert. denied, 117 S. Ct. 275 (1996); *Exxon Chemical Patents, Inc.* v. *Lubrizol Corp.*, 64 F.3d 1553 (Fed. Cir. 1995), reh'g denied, 77 F.3d 450 (Fed. Cir. 1996), cert. denied, 116 S. Ct. 2554 (1996); *National Presto Industries.* v. *West Bend Co.*, 76 F.3d 1185, 1190 (Fed. Cir. 1996); *Pall Corp.* v. *Micron Separations, Inc.*, 66 F.3d 1211, 1217-1218 (Fed. Cir. 1995), cert. denied, 117 S. Ct. 1243 (1997); *Quantum Corp.* v. *Rodime, PLC*, 65 F.3d 1577, 1580-1581 (Fed. Cir. 1995), cert. denied, 116 S. Ct. 1567 (1996); *Southwall Technology Inc.* v. *Cardinal IG Co.*, 54 F.3d 1570, 1577-1578 (Fed. Cir. 1995).

that is in fact the situation today: our review of Federal Circuit cases published since the en banc decision in *Markman* reveals that the court of appeals has rejected, in full or in part, 24 of the 58 claim constructions it has reviewed, a reversal rate *exceeding 40%*; other observers suggest an even higher reversal rate. See Goodin, *A "New Era" in Patent Law?*, INTELL. PROP., July 1997, at 19, 20. That alarming figure, reducing affirmance or reversal to about the probability of a coin toss, indicates the need to ensure that the court below is correctly and consistently applying this Court's decision in *Markman*.

### A. The Federal Circuit May Not Disregard The Meaning Of A Claim Term To A "Person Skilled In The Art" Unless The Patent Or Prosecution History Expressly Specifies A Contrary Meaning

The Patent Code dictates a baseline meaning for patent terms: the meaning to a "person skilled in the art" (35 U.S.C. § 112, ¶ 1). That meaning is the starting place and, if it "comports with the [patent] as a whole," *Markman*, 116 S. Ct. at 1395, may be the ending place as well. An appellate court therefore may not disregard the district court's reliance on that meaning, proved (as may be necessary) through "extrinsic evidence," to illuminate the definition of a claim term unless the patent or its prosecution history (the "intrinsic" evidence) expressly defines the term in a contrary manner, or those documents expressly abandon the customary meaning to a "person skilled in the art."

Persons skilled in the art, not lawyers or judges, are the intended audience for patents. See *Markman*, 52 F.3d at 986; see also *Mowry* v. *Whitney*, 81 U.S. (14 Wall.) 620, 644 (1871). Given the presumption of skilled readers, patent language "may leave something to their skill" that would escape a layman. *Id.* at 644. That is why responsible district courts recognize "the need for expert testimony" to elucidate "the meaning of claim terms to one of ordinary skill in the art at the time of invention." *Loral Fairchild Corp.* v. *Victor Co.*, 906 F. Supp. 798,

802 (E.D.N.Y. 1995) (Rader, J., of the Federal Circuit, sitting by designation).

The Federal Circuit in this case transformed the presumption that claim terms bear their usual meaning to persons skilled in the art into a presumption that the meaning to such persons is *irrelevant* unless no shade of meaning can be tortured from some fragment of "intrinsic" evidence. Conceding that "3% elasticity" was not expressly defined in the patent or the prosecution history, the Federal Circuit sought out any example of usage that it *might* construe as "inconsistent with the[] ordinary meaning" of "3% elasticity," regardless of how many times the term was used consistently with the "ordinary meaning." See App., *infra*, 13a (quoting *Vitronics Corp.* v. *Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)).

The first panel of the Federal Circuit that reviewed the meaning of "3% elasticity" in the '112 and '955 patents could discern *no* indication "in the specification, claims, or prosecution history * * * limiting the claim to complete recovery." App., *infra*, 118a-119a. By contrast, the panel that decided the present case concluded that the specification, claims and prosecution history imposed such a limit so clearly that it was error to consider extrinsic evidence showing what persons skilled in the art understood "3% elasticity" to mean. See *id.* at 12a, 20a & n.6. The panel did not explain how its colleagues in *Custom Optical* (and two district courts), in rejecting the same arguments, could have missed the supposedly clear meaning conveyed by a small set of documents.

Under any reasonable analysis, the contrary conclusion of one Federal Circuit panel and both district courts at the very least indicated that the patent documents and prosecution history left the meaning of the term "3% elasticity" sufficiently undefined that, in this Court's words, "it would undoubtedly be error in the court to reject [expert] testimony" about the ordinary meaning of the term to persons skilled in the art. *Seymour* v. *Osborne*, 78 U.S. (11 Wall.) 516, 546 (1871).

Where a court must engage in interpretive contortions to extract a particular term definition from a set of documents, the definition cannot be so obvious that a court may freely disregard "the distinctions which may exist in the words of a claim when read in the context of the art itself." *United Carbon Co. v. Binney & Smith Co.*, 317 U.S. 228, 233 (1942).

The Federal Circuit's approach — *excluding* from the claim interpretation the extrinsic evidence that established the definition of "3% elasticity" understood by persons skilled in the art — conflicts with decisions of this Court and with sound principles of claim construction.

1. *This Court Has Repeatedly Recognized The Importance Of Extrinsic Evidence To Determine What Patent Claim Terms Mean To A "Person Skilled In The Art"*

The Patent Code contemplates that patents are technical documents written for a technical audience. See 35 U.S.C. § 112, ¶ 1. Judges, even Federal Circuit judges, for the most part are not scientists or technicians, much less skilled in the art relevant to a particular patent. This Court long ago recognized that the meaning of a claim "is often unperceived, or but dimly perceived, by the uninitiated." *Bischoff*, 76 U.S. (9 Wall.) at 815. That is because the inventions claimed in patents "are commonly described by terms of the art or mystery to which they respectively belong; and these descriptions and terms of art often require peculiar knowledge and education to understand them aright." *Id.* at 815, quoted in *Markman*, 116 S. Ct. at 1394. "Irremediable errors" are the likely result when judges try to divine what technical terms mean from textual analysis alone, without the reality check provided by the testimony "of scientific persons familiar with the subjects of the inventions in question." *Id.* at 814.[6]

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[6] The rehearing petition to the Federal Circuit, which we have lodged with the Clerk of this Court, explains (at 4-10) how that court — unaided by

This Court consequently has made clear that it is not only "permissible," but "often necessary," for a court "to receive expert evidence to ascertain the meaning of a technical or scientific term or term of art so that the court may be aided in understanding not what the instruments mean but what they actually say." *U.S. Industrial Chemicals*, 315 U.S. at 678. Indeed, "[c]ases doubtless arise where the language of the specification and claim * * * is so interspersed with technical terms and terms of art that the testimony of scientific witnesses is indispensable to a correct understanding of its meaning." *Seymour*, 78 U.S. (11 Wall.) at 546. In such cases, "it would undoubtedly be error in the court to reject the testimony." *Ibid.*

This Court reaffirmed that line of precedent in *Markman*. The Court recognized that the "construction of terms of art" has "evidentiary underpinnings," 116 S. Ct. at 1396, and repeatedly acknowledged that judges — *trial* judges — may need to receive extrinsic evidence to understand properly the terms used in a patent. Because "it cannot be expected * * * that judges will always possess the requisite knowledge of the meaning of the terms of art or science" used in a patent, "it *often* becomes *necessary* that they should avail themselves of the light furnished by experts relevant to the significance of such words and phrases." *Id.* at 1394 (quoting A. WALKER, PATENT LAWS § 189, at 173 (3d ed. 1895)) (emphasis added). For that reason, "[w]here *technical terms* are used, or where the *qualities of substances* * * * mentioned or any similar data *necessary to the comprehension of the language of the patent* are unknown to the judge, the testimony of witnesses may be received upon these subjects, and any other means of information be employed." *Id.* at 1394-1395 (quoting 2 W. ROBINSON, LAW OF PATENTS § 732, at 481-483) (1890)) (emphasis added).

Indeed, this Court has relied on expert evidence to understand terms far more common than "3% elasticity" while con-

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expert guidance — misunderstood the relevant metallurgical technology.

struing patent claims. Thus, the Court has acknowledged that it could not, unaided, derive an accurate interpretation of a patent simply by following the specification, and explained its need for help in understanding the meaning, in context, of terms such as "trough," "wire," and "sliding-bar":

> [A]s it cannot be expected that the court will possess the requisite knowledge [to interpret the patent as would one skilled in the art], it becomes necessary that it should avail itself of the light furnished by the evidence to enable it to understand the terms used in the patent * * * .

*Loom Co.* v. *Higgins*, 105 U.S. 580, 586 (1882).

The Court later explicitly relied on extrinsic testimony to define a claim term when it reinstated the judgment of a district court over a reversal by the court of appeals. The Court observed that, "in many * * * cases, it is difficult for persons not skilled in the art to measure the inclusions or to appreciate the distinctions which may exist in the words of a claim when read in the context of the art itself." *United Carbon*, 317 U.S. at 233. And this Court has even overruled *its own* interpretation of a patent upon considering testimony and other extrinsic evidence not presented in the prior case. *Tilghman* v. *Proctor*, 102 U.S. 707, 708 (1880), overruling *Mitchell* v. *Tilghman*, 86 U.S. (19 Wall.) 287 (1873).

The Federal Circuit's out-of-hand rejection of expert evidence of the meaning of claim terms to persons skilled in the relevant art (see App., *infra*, 20a n.6) cannot be squared with the decisions of this Court.

2. *Extrinsic Evidence Provides An Important Safeguard Against Impractical Claim Constructions*

The precedents of this Court discussed above show that the Federal Circuit is wrong to reject the district courts' use of extrinsic evidence to define claim terms as they are understood by those skilled in the art. Judges who willfully screen out the scientific context in which patent claims are drafted, and in

which the statute explicitly *intends* them to be drafted, do not reach results superior to those reached by judges who steep themselves in the relevant art.

To the contrary, as Judge Easterbrook observed, "we ha[ve] a trial" in patent cases precisely because "[w]hat seems clear to a judge may read otherwise to a skilled engineer" — and, no matter how well one's stand-alone interpretation may cohere, it is "folly" to interpret patent documents without reference to the background understanding of those skilled in the relevant art. *Mahurkar*, 831 F. Supp. at 1359. For example, given the technological complexity of the field, it is no surprise that "claim construction in biotech patent cases almost always will require the submission of some extrinsic evidence." Poissant & Rabinowitz, *supra*, at C29. The alternative is to create binding legal precedent that is rooted in ignorance.

In addition, patent drafters have relied on the statutory invitation to express inventions in terms comprehensible to "persons skilled in the art," and thus have written "patents for an audience of technically-trained patent examiners." Mueller, *Crafting Patents for the Twenty-First Century*, 79 J. PAT. & TRADEMARK OFF. SOC'Y 499, 502 (1997). Now, however, the "maxim that 'a patentee may be her own lexicographer' is best read as warning that 'a patentee had *better* be her own lexicographer'" (*id.* at 505 (emphasis added)), defining any term that conceivably could be misunderstood by appellate judges who refuse to consider what terms mean to those "skilled in the art." Indeed, the prudent drafter also presumably should define any terms of art used in the *definitions* of claim terms.

More fundamentally, the Federal Circuit's decision here turns extrinsic evidence as to the meaning of a claim term to persons learned in the art — an issue that would seem incapable of proof by anything *other* than extrinsic evidence — into a side-show with no enduring effect on the outcome of a claim construction. If two or three Federal Circuit judges decide that a different formulation better harmonizes with their view of the

patent, that interpretation will control, regardless of the understanding of persons trained in the relevant art. But "[t]he specification of the patent is not addressed to lawyers, or even to the public generally, but to the manufacturers" of a patented product. *Carnegie Steel Co.* v. *Cambria Iron Co.*, 185 U.S. 403, 437 (1902). The Federal Circuit's emphasis on extracting any possible meaning from the patent documents in isolation, regardless of the gloss that one skilled in the art would put on the patent terms, strays far from that understanding. Review by this Court is essential to return the Federal Circuit to the statutory command.

### B. District Court Findings Regarding The Meaning Of Terms Of Art To Persons Skilled In The Art May Be Set Aside Only for Clear Error

The Federal Circuit ran roughshod over the district court's finding that a person skilled in metallurgy would have understood "3% elasticity" to include the ability of a metal strained more than 3% to recover its shape spontaneously to the extent of 3% of its total, *i.e.*, for a 100-millimeter rod stretched to 105 mm. to recover to 102 mm.[7] Under this Court's precedents as well as Rule 52(a) of the Federal Rules of Civil Procedure, that finding could be discarded only if it was clearly erroneous.

#### 1. *Factual Determinations Of District Courts, Although Antecedent To Legal Conclusions, May Be Set Aside Only If Clearly Erroneous*

In *Markman*, this Court observed that the trial court's resolution of "evidentiary questions of meaning" (116 S. Ct. at 1396) provides the necessary factual antecedent to the legal construction of the patent claims. The Court assigned the resolution of these anterior questions, as well as the ultimate legal interpretation of the patent, to the court rather than the

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[7] Where a frame does not recover its shape through spring-back alone, warming the metal to room temperature triggers the heat-recoverable shape-memory that, together with the spring-back, brings about complete recovery.

jury because of the superior position of trial judges "to find the *acquired meaning* of patent terms," and the courts' "trained ability *to evaluate the testimony* in relation to the overall structure of the patent." *Id.* at 1395 (emphasis added).

"Rule 52(a) is fully applicable to patent cases." 9A WRIGHT & MILLER, *supra*, § 2591, at 629 (1995). And patent claim construction is not meaningfully different from other ultimate legal questions, reviewable *de novo*, that rest on subsidiary questions of fact that are reviewed for clear error. For example, this Court recently held that district court determinations of reasonable suspicion and probable cause "should be reviewed *de novo* on appeal." *Ornelas* v. *United States*, 116 S. Ct. 1657, 1663 (1996). But the Court "hasten[ed] to point out that a reviewing court should take care * * * to review findings of historical fact only for clear error." *Ibid.* And in a Lanham Act case, the Court required deference, in the absence of clear error, to district court findings that "pharmacists did not understand" a drug substitution law — a conclusion that closely parallels a district court's conclusion that persons skilled in an art understand a term in a particular way. See *Inwood Laboratories, Inc.* v. *Ives Laboratories, Inc.*, 456 U.S. 844, 857 & n.18 (1982).

What a particular word meant to particular persons (those "skilled in the art") at a particular time (the filing of the patent application) is plainly a "historical fact" that, under *Ornelas*, may be reversed only for clear error. Moreover, in reversing the Federal Circuit in another patent law context, this Court recognized that "subsidiary determinations of the District Court" are subject to clear-error review even if the ultimate question (there, obviousness) is a matter of law. *Dennison Manufacturing Co.* v. *Panduit Corp.*, 475 U.S. 809, 811 (1986) (per curiam). Indeed, this Court identified "the level of ordinary skill in the pertinent art" as a "basic factual inquir[y]" antecedent to the legal judgment of obviousness. *Graham* v. *John Deere Co.*, 383 U.S. 1, 17 (1966).

Appellate review of district court factual findings is limited to clear error "even when the district court's findings do not rest on credibility determinations, but are based instead on physical or documentary evidence or inferences from other facts." *Anderson* v. *City of Bessemer City*, 470 U.S. 564, 574 (1985). Strong policies support a vigorous role for trial courts when they act as finders of fact as well as expositors of law. As this Court explained, "[t]he trial judge's major role is the determination of fact, and with experience in fulfilling that role comes expertise." *Id.* at 574. See *Markman*, 116 S. Ct. at 1395 (emphasizing trial court's superior ability "to find the acquired meaning of patent terms" and "to evaluate the testimony in relation to the overall structure of the patent"). "Duplication of the trial judge's efforts in the court of appeals" produces a "negligibl[e]" contribution to accuracy but exacts a "huge cost" in diverted judicial resources. *Anderson*, 470 U.S. at 574-575.

As this Court has noted repeatedly and in different contexts, "the trial on the merits should be 'the main event,'" and not a mere "tryout on the road." *Anderson*, 470 U.S. at 575 (quoting *Wainwright* v. *Sykes*, 433 U.S. 72, 90 (1977)). At trial in this case, the district court took advantage of the understanding of persons skilled in the art to provide a context within which the terms used in the patent documents could fall into place. The Federal Circuit nullified the trial itself when it refused to consider the district court's findings of fact based on extrinsic evidence, and instead adopted a forced and convoluted interpretation of the claim based on a misreading — and an alteration — of the patent and prosecution history.

2. *The General Rule Of Clear-Error Review Encompasses Factual Findings That Are Antecedent To District Court Constructions Of Patent Claims*

By mischaracterizing all findings related to claim construction as "legal" determinations reviewable *de novo*, see *Markman*, 52 F.3d at 981, the Federal Circuit has effectively removed trial courts from the business of claim construction.

Judge Mayer aptly pointed out that the Federal Circuit has "augment[ed]" its "power" (App., *infra*, 113a) by excusing consideration of the real-world meaning of claim terms whenever the court decides that such meaning is inconvenient and therefore "not necessary." *Id.* at 20a n.6.

Not only did the Federal Circuit treat as irrelevant the district court's findings with respect to the knowledge of one skilled in the art, but, unable to reconcile its preferred construction with the terms of the patent, the court of appeals asserted the existence of a "typographical error." The Patent Code provides an approved procedure for the correction of inadvertent errors in a patent, a procedure that requires discretionary action by the PTO rather than by a court. 35 U.S.C. §§ 254-255. Indeed, the PTO issued a three-page certificate of such errors for the '112 patent in 1990. See Pl. Trial Ex. 1. To alter a patent in a material respect — and the change from specifying complete shape-recovery through spring-back *plus* room temperature-induced shape-memory to specifying shape-recovery through spring-back alone was material, indeed dispositive, here (see Reh'g Pet. 2-3, 10-11) — a patentee would have to surrender the patent and win PTO approval in a reissue proceeding. See 35 U.S.C. § 251. Yet the court of appeals took it upon itself to "correct" the patent further by judicial fiat, despite the court's purported reliance on "intrinsic" evidence.

This overreaching response to inconvenient facts is of a piece with the Federal Circuit's misguided refusal to limit appellate review of predicate factual findings to the clearly erroneous standard. The court of appeals simply will not acknowledge that factual determinations play a necessary — and, in highly technical patent disputes, a salutary — role when judges decide what patents mean. As Judge Easterbrook observed, "judges should not pretend that all nominally 'legal' issues may be resolved without reference to facts." *Mahurkar*, 831 F. Supp. at 1359. Judge Learned Hand saw the issues with equal clarity. "The question * * * of how the art understood the term" is "plainly a question of fact," and thus such a finding is

"controlling" unless "clearly erroneous." *Harries* v. *Air King Products Co.*, 183 F.2d 158, 164 (2d Cir. 1950).

By contrast, the Federal Circuit's decision in *Markman* characterized *every* part of the claim construction process as legal and thus subject to *de novo* review. 52 F.3d at 981. Its premise was that a district court that "resolv[es] disputes *en route* to pronouncing the meaning of claim language" does not "credit[ ] certain evidence over other evidence or make factual evidentiary findings." *Ibid.* But the district courts that actually do the work know better. As one experienced trial judge observed, "When two experts testify differently as to the meaning of a technical term, and the court embraces the view of one, the other, or neither while construing a patent claim as a matter of law, the court *has* engaged in weighing evidence and making credibility determinations." *Lucas Aerospace, Ltd.* v. *Unison Industries, L.P.*, 890 F. Supp. 329, 333 n.7 (D. Del. 1995). "[W]hen the Federal Circuit * * * states that the trial court does not do something that the trial court does and must do to perform the judicial function, that court knowingly enters a land of sophistry and fiction." *Ibid.*

Although this Court affirmed the Federal Circuit's judgment in *Markman* allocating claim construction to judges, the Court did not address and, in fact, undermined the Federal Circuit's characterization of claim construction as purely legal and subject to *de novo* review. Like Judge Schwartz in Delaware, this Court recognized "that credibility judgments have to be made about the experts who testify in patent cases." *Markman*, 116 S. Ct. at 1395. Because of a judge's superior ability to harmonize expert testimony with "the overall structure of the patent," however, this Court determined that even expert witness credibility judgments, "notwithstanding [their] evidentiary underpinnings," are better left to the court than to a jury. *Id.* at 1395-1396.

This case presents the Court with an opportunity to complete the work begun in *Markman*, and establish that (1)

not all findings that a trial court makes in construing patent terms are necessarily "legal," but they include "a host of inherently factual subsidiary matters, such as how one skilled in the art would understand claim terms," *J.T. Eaton & Co.* v. *Atlantic Paste & Glue Co.*, 106 F.3d 1563, 1577 (Fed. Cir. 1997) (Rader, J., dissenting); and (2) appellate courts cannot disturb such findings in the absence of clear error.

## II. THE FEDERAL CIRCUIT IS DIVIDED ON THE QUESTION OF APPELLATE REVIEW PRESENTED HERE

Because the Federal Circuit has exclusive jurisdiction over patent appeals, 28 U.S.C. § 1295, there can be no conflicts among the circuits on patent issues. For that reason, published dissents, and particularly dissents from denial of rehearing en banc — such as the strong dissent here — provide an appropriate benchmark for disorder in the law requiring resolution by this Court. See generally Nies, *Dissents at the Federal Circuit and Supreme Court Review*, 45 AM. U. L. REV. 1519 (1996).

After *Markman*, panels of the Federal Circuit have continued to divide over the scope of appellate review of a district court's claim construction. Some judges, such as those on the panel in this case, insist that the Federal Circuit should construe patent claims entirely *de novo* and without reference to extrinsic evidence of the understanding of persons skilled in the art; other judges accord deference to district court findings of predicate fact, such as the meaning of claim terms. See Fram & Mitchell, *supra*, at C25.

This dispute is not semantic. Whether a Federal Circuit panel takes the trial process into account in rendering a claim construction in many cases determines the outcome. See *Eastman Kodak* v. *Goodyear*, 114 F.3d at 1555-1556 (affirming trial court claim construction), and *id.* at 1561-1564 (Lourie, J., dissenting); *J.T. Eaton & Co.*, 106 F.3d at 1568-1570 (rejecting trial court claim construction), and *id.* at 1572-1577 (Rader, J., dissenting). As recent commentators have remarked, "a dif-

ferent panel might well have reached the opposite conclusion" in a number of recent cases. Fram & Mitchell, *supra*, at C28 (citing the decision below). Indeed, different panels of the Federal Circuit, reviewing identical "intrinsic" evidence (the patent and prosecution history) reached opposite conclusions in this case and *Custom Optical*.

The panels in several post-*Markman* decisions have deprived the district court of *any* meaningful role in claim construction. Thus, in the *Lubrizol* case, the majority stated, over Judge Nies' dissent, that "[n]o matter when or how a judge performs the *Markman* task, on appeal [the Federal Circuit] review[s] the issue of claim interpretation independently without deference to the trial judge." *Exxon Chemical Patents, Inc.* v. *Lubrizol Corp.*, 64 F.3d 1553, 1556 (Fed. Cir. 1995), reh'g denied, 77 F.3d 450 (Fed. Cir. 1996). Another panel went so far as to say that claim construction at the appellate level should be entirely "unencumbered by the trial process." *Festo Corp.* v. *Shoketsu Kinzoku Kogyo Kabushiki Co.*, 72 F.3d 857, 863 (Fed. Cir. 1995), vacated on other grounds, 117 S. Ct. 1240 (1997). And another panel actually held that relying on extrinsic evidence to make a finding of fact as to the understanding of a term by a person learned in the relevant art is "improper" in "most situations." *Vitronics*, 90 F.3d at 1583-1585.

By contrast, a different panel of the Federal Circuit held that "the testimony of one skilled in the art about the meaning of claim terms at the time of the invention" is almost always relevant. *Kodak*, 114 F.3d at 1555. Some panels review claim construction "upon * * * the entire record," and "recogniz[e] both the trial court's 'trained ability to evaluate [expert] testimony in relation to the overall structure of the patent' and the trial court's 'better position to ascertain whether an expert's proposed definition fully comports with the specification and claims,'" *id.* at 1555-1556 (quoting *Markman*, 116 S. Ct. at 1395). See *Abtox, Inc.* v. *Exitron Corp.*, 122 F.3d 1019, 1023 (Fed. Cir. 1997) (noting role for "relevant extrinsic evidence" in "determining the meaning of disputed claim terms"). And

one panel clearly stated a deferential standard of review: "Where a district court makes findings of fact as part of a claim construction, we may not set them aside absent clear error." *Metaullics Systems Co.* v. *Cooper*, 100 F.3d 938, 939 (Fed. Cir. 1996).

The conflict within the Federal Circuit outlined above is symptomatic of the view among much of that court that claim construction is a literary exercise that has nothing to do with the trial record, nothing to do with the relevant art and the understanding of persons skilled in it, and nothing to do with the underlying science or technology. That ostrich-like attitude not only contradicts the statute but also leads to absurd results, such as the imposition in one recent case of "a scientific burden that," in the opinion of the sole Federal Circuit judge trained in the art relevant to that case, "is totally unnecessary and perhaps impossible to meet" — to support a claim interpretation raised for the first time by the panel majority. *Lubrizol*, 77 F.3d at 453 (Newman, J., dissenting from denial of rehearing en banc).[8]

Bright-line rules may be justified when they further predictability. But a bright-line rule requiring appellate courts in most cases to disregard the views of the trial judge and the evidence of the understanding of "person[s] skilled in the art" fosters *unpredictability*. Under such a rule, patent drafters rely at their own risk on the accepted meaning of terms of art to persons learned in the relevant art, unless all the patent documents anticipate and definitively exclude the possibility that two or three appellate judges may later wrest another meaning from the same terms. But as this Court recently remarked in *Warner-Jenkinson Co.* v. *Hilton Davis Chemical Co.*, that "brighter line," contradictory to common practice and common sense, does not provide its own justification; rather, "[t]o change so

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[8] See 77 F.3d. at 451 (Mayer, J., concurring in denial of rehearing en banc) ("Two judges have divined an interpretation of the claim that occurred to no one else in this extensive litigation."). See also *Lubrizol*, 64 F.3d at 1568 (Nies, J., dissenting from panel decision).

substantially the rules of the game now could very well subvert the various balances the PTO sought to strike when issuing the numerous patents * * * affected" by the novel approach of the court of appeals. 117 S. Ct. 1040, 1050 n.6 (1997).

The Federal Circuit has overstepped its bounds as an appellate court, to the detriment of accuracy and predictability in the administration of the patent laws. Moreover, time and time again it has rejected invitations to sit en banc to resolve, once and for all, the divisions within the Circuit that have created chaos in the interpretation of patent claims. Further review by this Court is warranted.

## CONCLUSION

The petition for a writ of certiorari should be granted.

Respectfully submitted.

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NOVEMBER 1997

# APPENDICES

## APPENDIX A

CVI/BETA VENTURES, INC., Plaintiff-Appellee, Marchon Eyewear, Inc., Marcolin USA, Inc., and Rothandberg, Inc., Plaintiffs-Appellees,

v.

TURA LP and Brodart Co., Defendants-Appellants, and Arthur Brody, Defendant, and Bracken Opticians, Defendant.

No. 96-1167.

United States Court of Appeals, Federal Circuit.

May 1, 1997.

James J. Maune, Brumbaugh, Graves, Donohue & Raymond, New York City, argued, for plaintiff-appellee CVI/BETA Ventures, Inc. Of counsel was David T. Cunningham.

Edgar H. Haug, Curtis, Morris & Safford, P.C., New York City, argued, for plaintiffs-appellees Marchon Eyewear, Inc., Marcolin U.S.A., Inc. and Rothandberg, Inc. Of counsel on the brief were John R. Lane, Daniel G. Brown, and Yvonne K. Tran. Also on the brief was Robert J. Mathias, Piper & Marbury, L.L.P., Baltimore, MD.

Donald R. Dunner, Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P., Washington, DC, argued, for defendants-appellants. With him on the brief was Darrel C. Karl.

Before MICHEL, Circuit Judge, FRIEDMAN, Senior Circuit Judge, and SCHALL, Circuit Judge.

SCHALL, Circuit Judge.

This is an appeal from a final judgment of the United States District Court for the Eastern District of New York in a patent infringement suit. *CVI/Beta Ventures v. Tura LP*, 905 F.Supp. 1171 (E.D.N.Y. 1995). CVI/Beta Ventures, Inc. (CVI) is the assignee of United States Patent Nos. 4,772,112 (the '112 patent) and 4,896,955 (the '955 patent). The patents relate to flexible eyeglass frames. Marchon Eyewear, Inc. (Marchon) is the exclusive licensee under the patents. Marcolin USA, Inc. (Marcolin) and Rothandberg, Inc. (Rothandberg) are corporations which are affiliated with Marchon. We refer to CVI, Marchon, Marcolin, and Rothandberg collectively as "CVI/Marchon." Tura LP and Brodart Co. (collectively, "Tura") supply eyeglass frames to eyeglass retailers and distributors.

CVI and Marchon sued Tura in the United States District Court for the Eastern District of Virginia, alleging that various Tura frame models infringed the '112 and '955 patents. After the case was transferred to the Eastern District of New York, Marcolin and Rothandberg were joined as plaintiffs. In its answer, in addition to denying infringement, Tura asserted counterclaims under the antitrust laws and a counterclaim for patent misuse under 35 U.S.C. § 271(d). Tura also sought a declaratory judgment of patent invalidity. Following a jury trial, claims 1-3, 5, and 6 of each patent were found to be not invalid and to be infringed by Tura LP, while Brodart Co. was found liable for inducing infringement. *CVI/Beta Ventures*, 905 F.Supp. at 1175. The jury further found that CVI was entitled to a reasonable royalty of 6%, and that Marchon, Marcolin, and Rothandberg collectively were entitled to lost profits and price erosion damages. *Id.* at 1204. In view of its verdict, the jury did not reach any of Tura's counterclaims.

Following the denial of Tura's renewed motion for a judgment of non-infringement as a matter of law (JMOL), judgment was entered in favor of CVI against Tura in the total amount of $819,208, plus prejudgment interest and attorneys fees, and in favor of Marchon, Marcolin, and Rothandberg against Tura in the total amount of $12,585,093, plus prejudgment interest. *Id.* In addition, Tura was enjoined from further infringement.[1] *Id.*

Tura now appeals the final judgment of the district court. It argues that the court erred in its claim construction in deciding the renewed JMOL motion and that it erroneously instructed the jury to presume that one of the limitations of claim 5 of the patents was found in certain of Tura's accused frames. It also argues that Marcolin and Rothandberg were improperly joined as plaintiffs because they lack standing.[2]

We conclude that the district court did err in its claim construction. We also conclude that, when the claims are properly construed, because of CVI/Marchon's failure of proof, Tura is entitled to a judgment of noninfringement as a matter of law. Accordingly, we (i) reverse the judgment of infringement, (ii) vacate the award of damages and the injunction entered against Tura, and (iii) remand the case to the district court for entry of judgment of noninfringement in favor of Tura and for further proceedings in connection with Tura's counterclaims. In view of our decision, we do not reach the jury instruction issue or the issue of Marcolin and Rothandberg's standing.

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[1] Suit also was brought against Arthur Brody and Bracken Opticians for inducing infringement. The district court dismissed the claim against Brody on venue grounds, and no judgment was entered against Bracken. Neither party is involved in this appeal.

[2] No validity issues are raised on appeal.

# BACKGROUND

## I.

The '112 patent was issued on September 20, 1988. The '955 patent was issued on January 30, 1990, as a continuation-in-part of the application that resulted in the '112 patent. The named inventors on the two patents are Robert B. Zider and John F. Krumme. On May 21, 1991, a reexamination certificate was issued for the '955 patent, confirming the patentability of all of the claims of the patent. It is stated in each of the patents that the purpose of the invention is "to provide eyeglass frames which (1) are highly resistant to permanent deformation, or 'kinking,' over the full range of ambient temperatures, or (2) are sufficiently resistant to deformation and are readily restorable to the undeformed shape by heating ...." '112, col. 2, lines 21- 26; '955, col. 2, lines 21-26.

The eyeglass frames invented by Zider and Krumme are fabricated from a "nickel-titanium based shape-memory alloy." A shape-memory alloy is an alloy which exhibits the ability to return to its original shape after being deformed. In other words, the alloy "remembers" its original shape and seeks to return to that shape after a deforming force is removed.

The prior art discussed shape-memory alloys as potentially useful in eyeglass frames. There was, however, an obstacle to effective use of such alloys in frames. The obstacle lay in the fact that the shape-memory characteristics of the alloys only exhibited themselves over a narrow temperature range. As stated in the '955 patent, that range was "too narrow to be of service to eyeglass frames which must function in winter days as cold as -20°C. and in hot sunny days with possible

temperatures over 40°C."[3] '955, col. 2, lines 8-10. Zider and Krumme overcame this obstacle by inventing eyeglass frames fabricated from a nickel-titanium based shape-memory alloy that had been modified by work-hardening (hammering, pressing, or stretching the alloy) or by a combination of work-hardening and heat treatment. '112, col. 2, lines 29-51; '955, col. 2, lines 21-55. As a result, Zider and Krumme's eyeglass frames have the ability to resist deformation over an ambient temperature range of -20°C. to +40°C.

Both the '112 and the '955 patents have eight claims, two of which (numbers 1 and 5) are independent. The claims of the patents are substantially similar. Claims 1 and 5 of the '955 patent are illustrative:

> 1. An eyeglass frame having at least a portion thereof fabricated from nickel-titanium based shape-memory alloy, said portion being in the work-hardened pseudoelastic metallurgical state, said portion having been subjected to work-hardening and having a low effective elastic modulus giving a soft, springy feel, said portion having greater than 3% elasticity over a temperature range from -20°C. to +40°C.
>
> * * * * * *
>
> 5. An eyeglass frame having at least a portion thereof fabricated from nickel-titanium based shape-memory alloy, said portion being in the work-hardened and heat-treated condition, said portion having been subjected to at least 30% work-hardening followed by a heat-treatment at a temperature not exceeding 400°C. for not less than one hour and having a minimum of 3% heat-recoverable shape-memory, a yield strength greater than 30,000 psi and at least 3% elasticity.

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[3] -20°C. is equal to -4°F. +40°C is equal to +104°F.

'955, col. 13, line 33 — col. 14, line 5, col. 14, lines 16-24.

Claim 1 of the '112 patent differs from claim 1 of the '955 patent in that (i) it does not contain the word "pseudoelastic," (ii) it specifies "at least 30%" work-hardening, and (iii) it refers to "4%" elasticity. '112, col. 12, lines 14-22. The only difference between claim 5 of the '112 patent and claim 5 of the '955 patent is that the former calls for "20%" work-hardening. '112, col. 12, lines 33-41. In both patents, dependent claims 2-4 and 6-8 relate to eyeglass temples, bridges, and nosepads. As will be seen, the claim construction issue in this case centers on the 3% and 4% elasticity limitations.

As used in the patents, the term "pseudoelastic" refers to the ability of a shape-memory alloy to return to its original shape after deformation, within a narrow ambient temperature range. Thus, in claim 1, the inventors claim eyeglass frames fabricated from nickel-titanium based alloys which have "pseudoelastic" shape-memory characteristics but which have been work-hardened so that they resist permanent deformation to the extent indicated ("greater than 3% elasticity") over a useful ambient temperature range. The eyeglass frames claimed in claim 5 of the patents also are fabricated from nickel-titanium based shape-memory alloys which have been work-hardened. In addition, however, the alloys have undergone heat-treatment. Heat-treatment increases the ability of the alloys to resist permanent deformation by imparting to them the quality of "heat-recoverable shape-memory." A component made from an alloy which exhibits "heat-recoverable shape-memory," if stressed by a deforming force at a temperature below the alloy's transformation temperature,[4] may exhibit some amount of

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[4] The term "transformation temperature" refers to the temperature region at which an alloy exhibits a change in its elastic properties,

residual strain when the stress on it is released. This strain is recovered, however, and the component returns to its original shape, when the component is warmed above the alloy's transformation temperature. Thus, the eyeglass frames of claim 5 exhibit the ability to resist permanent deformation to the extent of "3% heat-recoverable shape-memory" and "at least 3% elasticity" over a useful ambient temperature range.

II.

CVI and Marchon brought their action against Tura following reexamination of the '955 patent. In due course, after Marcolin and Rothandberg were joined as plaintiffs, with the consent of the parties the case was tried before a jury with a United States magistrate presiding. At trial, CVI/Marchon asserted that nine Tura frame models infringed claims 1-3, 5, and 6 of the '112 and '955 patents. At the close of the evidence, Tura moved for JMOL pursuant to Fed. R. Civ. P. 50(a), based upon its construction of the elasticity limitations of the claims. Tura argued that the Turaflex frames did not meet those limitations, as properly construed. Tura's motion was denied.

Tura also asked the magistrate to instruct the jury as follows with respect to the meaning of the elasticity limitation in claim 1 of the '955 patent:

> The Defendants contend that "greater than 3% elasticity" means that when a force is applied to the frame to stretch it to a length at least 3% greater than its original length, and then the force is taken away, the frame will return to its *original* length. Moreover, the frame must exhibit this complete recovery from being stretched 3% ...

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resulting from a change in the crystalline structure of the alloy at the microscopic level.

whether the stretch and release is at any temperature from -20 degrees C to +40 degrees C.

Tura sought a similar instruction with respect to the 4% elasticity limitation of claim 1 of the '112 patent.

As far as claim 5 of the '955 patent was concerned, Tura asked the magistrate to give the jury the following instruction:

> [T]he Defendants contend that the phrases "3% heat recoverable shape-memory" and "3% elasticity" means [*sic.*] that when a component is stretched at room temperature to a length 3% greater than its original length, it will return to its original length when the stretching force is removed. However, if the component is overstretched at room temperature so that upon removal of the stretching force, the frame component remains 3% longer than when it started, then applying heat such as hot water, will cause the frame component to return to its original length.

Tura sought a similar instruction with respect to claim 5 of the '112 patent.

The magistrate declined to instruct the jury on the meaning of the claims. Rather, he only gave the jury general instructions relating to claim construction. The magistrate informed the jury that it should look to the ordinary meanings of the words used in the claims and that it should consider the patent specifications and the prosecution histories. The magistrate also instructed the jury that it should construe the claims as they would be construed by one of ordinary skill in the art, unless the specifications indicated that the inventors intended other meanings. After finding Tura LP liable for infringement of the asserted claims and Brodart Co. liable for inducing infringement, the jury awarded the damages noted above. *CVI/Beta Ventures*, 905 F.Supp. at 1204.

Following the jury verdict, Tura renewed its JMOL motion pursuant to Fed. R. Civ. P. 50(b). *Id.* at 1175. Tura argued that the Tura frames did not infringe the two patents because they did not meet the elasticity limitations of the claims at issue. Tura based its argument on the construction of those limitations that it had advanced in its proposed jury instructions. The magistrate described as follows CVI/Marchon's and Tura's positions on the claim construction issue:

> The difference in the definitions of elasticity advanced by the parties concerns the behavior exhibited when the stresses on the rods are released. Plaintiffs assert that the term 3% elasticity refers to the ability of a metal item to "spring back" or recover in an amount equal to 3% of its original length after being subjected to stress. For example, to exhibit 3% elasticity as interpreted by plaintiffs, a metal rod 100 centimeters in length, after being stretched to a length of 105 centimeters when stressed, must, when the stress is released, "spring back" by an amount equal to 3% of its original length, or 3 centimeters, to a length of 102 centimeters.
>
> According to defendants, 3% elasticity requires that a metal item return precisely to its original shape after being strained by at least 3% of its original length. In other words, to exhibit 3% elasticity as interpreted by defendants, a rod 100 centimeters in length, after being stretched to a length of 103 centimeters when stressed, would be required to recover fully and return spontaneously to its original length of 100 centimeters when the stress was released. (The behavior of the rod upon the release of stress after having been pulled to 105 centimeters is irrelevant to defendants' interpretation.) In contrast, while plaintiffs' definition would encompass full recovery from a 3% strain as one example of 3%

> elasticity, plaintiffs contend that any "spring back" of at least 3%, whether or not the component returns to its original shape, is sufficient to meet the element of the patent claims.

*Id.* at 1177.

Under Tura's construction of the term "3% elasticity" what is required is that an eyeglass frame component completely recover from a strain of 3%. Thus, according to Tura, the percentage appearing before the word "elasticity" refers to the amount of strain (or stretch) to which the component is subjected. Under Tura's construction, as long as a 100 centimeter rod can fully return to its original shape when stretched to 103 centimeters, it is of no consequence whether the same rod returns by 2, 3, or 5 centimeters toward its original shape when pulled to 105 centimeters. Therefore, under Tura's claim construction, "greater than 3% elasticity" in claim 1 of the '955 patent means that a 100 centimeter rod must fully return to its original shape when stretched to, say, 103.5 centimeters. Under CVI/Marchon's claim construction, "greater than 3% elasticity" means that a 100 centimeter rod stretched 3.5% to 103.5 centimeters must recover from that 3.5 centimeter stretch to the extent of at least some increment greater than 3 centimeters, for example, 3.1 centimeters. It need not, however, fully recover to 100 centimeters in length, as it must under Tura's construction.

The magistrate rejected Tura's claim construction argument. After examining the language of the claims, the specifications, the prosecution history, and extrinsic evidence in the form of expert testimony, he concluded that the term "3% elasticity is properly construed to refer to the behavior exhibited by a component which, when strained by a deforming force to a length in excess of 3% of its original length, springs back by at least 3% of its original length when the force is released." *Id.* at 1182-83. Noting that Tura's

JMOL motion was premised on the claim construction which he had rejected, the magistrate denied the motion. *Id.*

## DISCUSSION

### I.

Judgment as a matter of law against a party is appropriate when "a party has been fully heard on an issue and there is no legally sufficient evidentiary basis for a reasonable jury to find for that party on that issue...." Fed. R. Civ. P. 50(a)(1). We review the district court's decision to deny Tura's JMOL motion de novo by reapplying the JMOL standard. *Maxwell v. J. Baker, Inc.*, 86 F.3d 1098, 1104, 39 USPQ.2d 1001, 1004 (Fed. Cir. 1996); *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 975, 34 USPQ.2d 1321, 1326 (Fed. Cir. 1995) (*in banc*), *aff'd*, --- U.S. ----, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996).

Determining whether a patent claim has been infringed requires a two-step analysis: "First, the claim must be properly construed to determine its scope and meaning. Second, the claim as properly construed must be compared to the accused device or process." *Carroll Touch, Inc. v. Electro Mechanical Sys., Inc.*, 15 F.3d 1573, 1576, 27 USPQ.2d 1836, 1839 (Fed. Cir. 1993). Claim construction is a question of law which we review de novo. *Markman*, 52 F.3d at 988, 34 USPQ.2d at 1337. The application of a properly construed claim to an accused device is a question of fact which, following a jury trial, we review for substantial evidence. *Genentech, Inc. v. Wellcome Found., Ltd.*, 29 F.3d 1555, 1565, 31 USPQ.2d 1161, 1168-69 (Fed. Cir. 1994).

### II.

As seen above, the claim construction issue in this case centers on the "elasticity" limitations of independent claims

1 and 5 of the '112 and '955 patents. On appeal, Tura advances the same argument it raised before the district court. Thus, it contends that the "greater than 3% elasticity" limitation in claim 1 of the '955 patent describes the ability of an eyeglass frame component to return completely and spontaneously to its original shape after being stretched by more than 3% of its original length. Under Tura's construction of claim 1, the concept of "elasticity" requires complete recovery with zero residual strain — at least up to the point at which the component is strained to such an extent that it exceeds what we may call its "elastic limit." When the component is stretched to such an extent that it exceeds its elastic limit, it is permanently deformed. CVI/Marchon urges that the district court's claim construction--under which complete recovery to zero is not required--is correct.

In determining the proper construction of a claim, "the court should look first to the intrinsic evidence of record, *i.e.*, the patent itself, including the claims, the specification, and if in evidence, the prosecution history." *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582, 39 USPQ.2d 1573, 1576 (Fed. Cir. 1996). We have described such intrinsic evidence as "the most significant source of the legally operative meaning of claim language." *Id.* Extrinsic evidence (*e.g.*, expert testimony) also may be used in claim construction. *Id.* However, when "an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term," it is improper to rely on extrinsic evidence. *Id.* at 1583, 39 USPQ.2d at 1577.

As used in the '112 and the '955 patents, respectively, 4% and 3% "elasticity" are technical terms. We have stated that "[a] technical term used in a patent document is interpreted as having the meaning that it would be given by persons experienced in the field of the invention, unless it is apparent from the patent and the prosecution history that the inventor

used the term with a different meaning." *Hoechst Celanese Corp. v. BP Chems. Ltd.*, 78 F.3d 1575, 1578, 38 USPQ.2d 1126, 1129 (Fed. Cir. 1996). Thus, "it is always necessary to review the specification to determine whether the inventor has used any terms in a manner inconsistent with their ordinary meaning." *Vitronics*, 90 F.3d at 1582, 39 USPQ.2d at 1577.

The claims of the '112 and '955 patents do not define the terms 4% and 3% "elasticity." We thus turn to the specifications.[5] In that regard, the patent drawings are highly relevant in construing the elasticity limitations of the claims. Of particular importance are Figures 2F, 2G, and 2H, which are reproduced below:

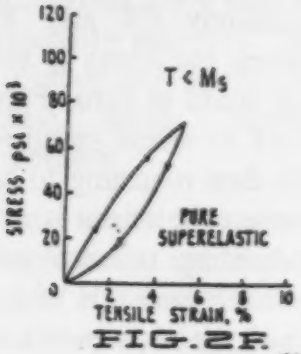


FIG. 2F.

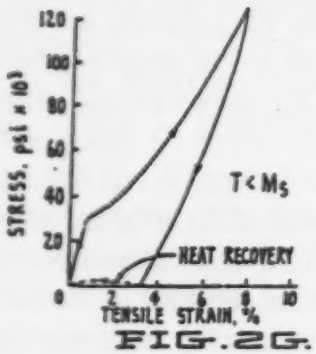


FIG. 2G.

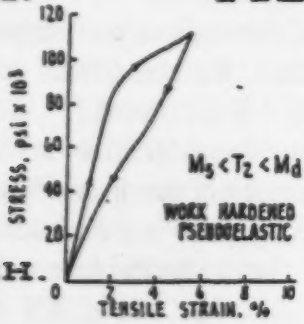


FIG. 2H.

[5] The specification for the '112 patent contains a typographical error. Under the heading "DESCRIPTION OF THE PREFERRED EMBODIMENT," the reference in column 4 at line 64 to "FIG. 2g" should be to "FIG. 2f." This is clear from the context.

The figures are graphs depicting, in the form of stress-strain curves, stress-strain behavior at different temperatures (T). In each graph, the stress (or the pulling force) to which the alloy being tested is subjected is measured on the vertical axis. The horizontal axis plots the strain which the alloy being tested exhibits at any given amount of stress. In other words, the horizontal axis shows the degree to which the alloy stretches when it is pulled and the degree to which it returns to its original shape when the pulling force is reduced or released. '112, col. 3, lines 20-27; '955, col. 3, lines 43-54. Figures 2F and 2H show, up to a certain limit, complete release of stress causing strain to return to zero. Although for different temperature ranges, Figures 2F and 2H both show an alloy (i) being subjected to stress resulting in a strain of approximately 6% and (ii) then returning to its original shape when the stress is released. Figure 2G shows partial return of strain to zero. Figure 2G shows an alloy (i) being subjected to stress resulting in a strain of between 6 and 8% and (ii) then returning to between 3 and 4% of its original shape when the stress is released. Figure 2G also shows strain returning to zero upon the application of heat. Referring to Figure 2H above, the specifications for both the '112 and the '955 patent state as follows: "Thus, throughout the temperature region of interest for eyeglass frames, the component acts completely elastically up to strains of 6% or more." '112, col. 5, lines 24-26; '955, col. 5, line 68-col. 6, line 3. The specification for the '955 patent continues in the immediately following paragraph to give an example of an embodiment of claim 1. The example states that a "suitable component" will "support a stress of over 150 ksi ... at 4% tensile strain and show complete elastic spring back at room temperature." '955, col. 6, lines 5- 14. The specification concludes the discussion of the indicated example by stating that "[f]rom the above, it can be seen that an eyeglass frame may be constructed with

portions thereof exhibiting optimized elasticity, such portions ... having greater than 6% elasticity over a temperature range from -20°C. to +40°C." '955, col. 6, lines 19-25.

The specification for the '112 patent contains no examples of the claim 5 embodiment. Each example of a claim 5 component in the '955 patent specification exhibits some degree of retained strain, which is removed by heating. The first example is of a component which, after having been subjected to a 7.5% strain and then having the strain released, "gives 3.7% elastic spring back and imparts 3.8% shape-memory recovery when heated." '955, col. 6, lines 60-62. The second example is of a component which, when subjected to a 7.25% strain and then having the strain released, "gives 5.0% elastic spring back and imparts 2.25% shape-memory recovery" when heated. ' 955, col. 7, lines 3-5. Figure 2G above depicts the behavior of an alloy possessing both "elasticity" and "heat-recoverable shape-memory."

We turn next to the prosecution history. We have stated that "arguments made during prosecution regarding the meaning of a claim term are relevant to the interpretation of that term in every claim of the patent absent a clear indication to the contrary." *Southwall Techs. Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1579, 34 USPQ.2d 1673, 1679 (Fed. Cir.), *cert. denied*, --- U.S. ----, 116 S.Ct. 515, 133 L.Ed.2d 424 (1995). Prosecution history "limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution." *Id.* at 1576, 34 USPQ.2d at 1676. *See also Biodex Corp. v. Loredan Biomedical, Inc.*, 946 F.2d 850, 863, 20 USPQ.2d 1252, 1262-63 (Fed. Cir. 1991) (a particular interpretation of a claim can be disclaimed by the inventor during prosecution).

We consider first statements made by the inventors during the prosecution of the '112 patent. Claims 1-16 in the

application for the '112 patent originally were rejected by the examiner as being unpatentable over various Japanese patent references. In that regard, what was then an amended version of claim 1 was rejected under 35 U.S.C. § 103 as obvious over Japanese reference P56-89717 (the '717 reference). The '717 reference teaches eyeglass frames having at least a portion made from shape-memory alloy. It also teaches work-hardening as part of the fabrication process. The applicants amended claim 1 again, thereby putting it into its present form. Thereafter, in the Remarks portion of the Response to Office Action, the applicants sought to distinguish their further-amended claim 1 over the '717 reference. The applicants argued that claim 1 was "specific to Applicants' first embodiment of frame components with optimized elasticity." Claim 1, they continued, "recites that the component will have at least 4% elasticity over the expected usage temperature range of -20°C. to +40°C. and will have a low effective elastic modulus which gives it a soft, springy feel." Applicants stated that "[t]he figure which illustrates this embodiment is Fig. 2H." Figure 2H, of course, depicts full return to zero after the release of stress.

In 1990, both CVI and Tura LP sought reexamination of claim 1 of the '955 patent. The reexamination focused on an article published in 1982 in *Journal de Physique*, a French publication. The article was by O. Mercier and E. Torok and was titled "Mechanical Properties of the Cold-Worked Martensitic NiTi Type Alloys" ("Mercier"). Among other things, Mercier discusses the pseudoelastic properties of nickel-titanium alloys. Tura LP argued that claims 1-4 of the '955 patent would have been obvious over Mercier because "Mercier et al. fully disclose the nickel-titanium based shape-memory alloy defined in claims 1-4."

In making its obviousness argument, Tura LP pointed to Figure 2H from the '955 patent. It asserted that Figure 2H illustrated "[t]he behavior of the alloy in the work-hardened pseudoelastic state" and that "[i]n this condition, the alloy is claimed to have greater than 3% elasticity over a temperature range from -20°C. to +40°C." It then turned to Figure 4 of Mercier, which is shown below:

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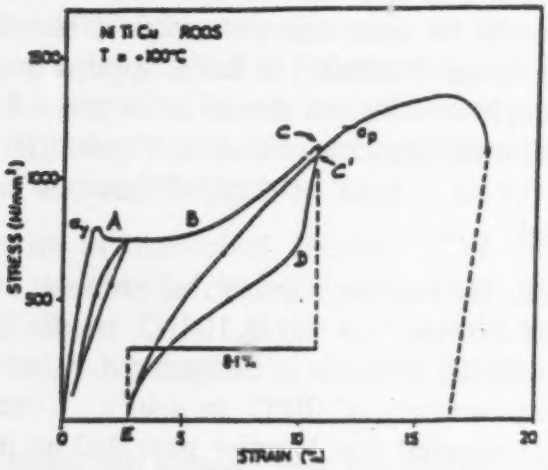


Fig. 4: Stress-strain curve of a NiTiCu specimen measured at 100 C.

[App. 7031]

Tura LP argued that curve EC'DE of Mercier "perfectly anticipates Fig. 2H of the Zider et al. patent." That curve, it elaborated, "shows an elasticity, between points C' and E of 8.1%, which anticipates 'greater than 3% elasticity' set forth in the patent." Thus, in the reexamination proceeding, Tura advanced the construction of the term "greater than 3% elasticity" which the district court adopted and which CVI/Marchon urges. This is so because Figure 4 of Mercier clearly shows (i) a deforming stress resulting in a strain of 11%, (ii) release of that stress, and (iii) a recovery of 8.1%

(which is a recovery of more than 3% but not a return to zero.)

CVI responded by seeking to distinguish claim 1 of the '955 patent over Mercier. Noting that Figure 4 of Mercier exhibited a "3% retained strain" when the deforming stress was removed, CVI argued that

> Figure 2H of the '955 patent shows how the *work-hardened pseudoelastic material* covered by claim 1 will behave at temperatures between Ms and Md and it can clearly be seen that the material is totally elastic when a stress of about 115 ksi is applied and removed. The sample of Mercier shown in Figure 4 clearly does not exhibit the properties shown in Figure 2H of the '955 patent when a load of 1150 $N/mm^2$ is applied and removed.

CVI also argued that a person of ordinary skill in the art would not consider the test at 100°C. shown in Figure 4 of Mercier as being pertinent in designing eyeglass frames to be worn at temperatures of -20°C. to +40°C. Continuing in this vein, CVI asserted that Mercier provided no information as to what the properties of the sample tested at 100°C. in Figure 4 would be in the temperature range of -20°C. to +40°C. Under these circumstances, CVI stated, "Mercier does not provide any suggestion of the unique combination of properties which can be obtained with nickel-titanium alloys in the *work-hardened pseudoelastic state.*" CVI then contrasted the meaning of "8.1% elasticity" in Mercier with the "3% elasticity" of claim 1: [T]he third party [Tura] contends that the 8.1% elasticity shown in Figure 4 anticipates the 3% elasticity of claim 1. The 8.1% elasticity shown in Figure 4 of Mercier comes at the expense of a 3% retained strain, that is, the material will not return to its original shape. The material covered by Claim 1 of the '955 patent exhibits at least 3% elasticity over the temperature

range -20 to +40°C. The elasticity set forth in Claim 1 is attainable prior to the onset of permanent deformation. Otherwise, the recited elasticity properly [sic] would be meaningless. That is, elasticity measurements are used to indicate how much a material can be elastically deformed. Once a material is plastically deformed, it no longer will return to its original shape. With respect to the data shown in Figure 4 of Mercier, if the sample prior to testing corresponded to a finished part, after applying a load of 1150 $N/mm^2$ and releasing the load, the part would be deformed such that it exhibited 3% retained strain. In the context of eyeglass frames, a frame which is deformed by 3% strain yet exhibits 8.1% elasticity is of no value since the 3% permanent deformation would result in significant distortions in the original shape of the frame.

Finally, in its discussion of Mercier, CVI referred to excerpts from *Mechanical Metallurgy* by G.E. Dieter, Jr. (McGraw-Hill Book Co., 1961), as "explaining 'elastic behavior', 'plastic deformation'...." The Dieter reference states in part:

> Experience shows that all solid materials can be deformed when subjected to external load. It is further found that up to certain limiting loads a solid will recover its original dimensions when the load is removed. The recovery of the original dimensions of a deformed body when the load is removed is known as *elastic behavior*. The limiting load beyond which the material no longer behaves elastically is the *elastic limit*. If the elastic limit is exceeded, the body will experience a permanent set or deformation when the load is removed. A body which is permanently deformed is said to have undergone *plastic deformation*.

In affirming the patentability of the claims of the '955 patent, the examiner rejected Tura LP's argument that

Mercier anticipated claim 1. Considering Mercier, the examiner noted that Mercier involved a different alloy than the one in the '955 patent and that it exhibited "desired properties in a temperature range outside that limited by the claim." Under these circumstances, the examiner wrote, "the materials of Zider et al are not anticipated by Mercier et al. Further, since the results of a change in materials are unpredictable, there is no suggestion that such a change would have been obvious, *or that such a change would produce desirable results*."

III.

Having reviewed the patent specifications and the prosecution histories,[6] we conclude that the district court erred in its claim construction. We conclude that, as used in claims 1 and 5 of the '112 and the '955 patent, the word "elasticity" refers to the ability of an eyeglass frame component to return completely and spontaneously to its original shape after it is subjected to stress and the stress is removed, provided that the stress to which the component is subjected does not cause the component to exceed its elastic limit. We also conclude that the percentages appearing before the word "elasticity" in claims 1 and 5 of the patents refer to the amount of strain to which the eyeglass frame component is subjected. Thus, "greater than 3% elasticity" in claim 1 of the '955 patent means that a 100 centimeter rod must fully return to its original shape when stretched to some length over 103 centimeters. By the same token, "at least 3% elasticity" in claim 5 of the '955 patent means that the same rod must fully return to its original shape when stretched to any length under 103 centimeters.

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[6] We view this as a case in which reliance on extrinsic evidence (*e.g.*, expert testimony) is not necessary.

Even standing alone, the specifications suggest this construction. Figures 2F and 2H above plainly show complete return to zero after the release of stress. At the same time, the specifications for both patents refer to Figure 2H and use the term "completely elastically" when referring to the desired behavior of eyeglass frame components. '112, col. 5, lines 24-26; '955, col. 5, line 68-col. 6, line 3. Likewise, the specification for the '955 patent states that a "suitable component" will show "complete elastic spring back at room temperature." '955, col. 6, lines 5-14. Finally, the reference to complete elasticity "up to strains of 6% or more" in both patents, and the reference to a similar degree of elasticity "at 4% tensile strain" in the '955 patent support the conclusion that the percentages appearing before the word "elasticity" in the patents indicate the amount of strain to which the eyeglass frame component is subjected.

CVI/Marchon correctly notes that the specification for the '112 patent recites that Figures 2F and 2H "represent the ideal characteristics for use in eyeglass components," and that the specification for the '955 patent states that Figures 2F and 2H represent "the ideal characteristics for use in purely elastic eyeglass components ...." '955, col. 5, lines 19-21. CVI/Marchon argues that "neither the '112 nor the '955 patent claims are limited to the 'optimum' embodiment."

CVI/Marchon is correct that, as a general matter, the claims of a patent are not limited by preferred embodiments. *See Sjolund v. Musland*, 847 F.2d 1573, 1581, 6 USPQ.2d 2020, 2027 (Fed. Cir. 1988) (noting that while claims are to be interpreted in light of the specification, it does not follow that limitations from the specification may be read into the claims); *Constant v. Advanced Micro-Devices Inc.*, 848 F.2d 1560, 1571, 7 USPQ.2d 1057, 1064 (Fed. Cir. 1988) ("Although the specification may aid the court in interpreting the meaning of disputed language in the claims, particular

embodiments and examples appearing in the specification will not generally be read into the claims."). However, as discussed above, through statements made during prosecution or reexamination an applicant for a patent or a patent owner, as the case may be, may commit to a particular meaning for a patent term, which meaning is then binding in litigation. That, we believe, is what happened here. Statements made during prosecution of the '112 patent and during reexamination of the '955 patent compel the conclusion that it was the intention of the inventors that, as used in claims 1 and 5, "elasticity" means total recovery prior to the onset of permanent deformation.

We note first the statement made during the prosecution of the '112 patent that amended claim 1 of the application was "specific to Applicants' first embodiment of frame components with optimized elasticity" and that "[t]he figure which illustrates this embodiment is Fig. 2H." Figure 2H clearly shows return to zero after the release of deforming stress. Thus, the inventors clearly tied "elasticity" in claim 1 of the '112 patent to the concept of total recovery. The statements in the '112 and '955 specifications that Figures 2F and 2H represent "ideal characteristics" are not inconsistent with this meaning for "elasticity."

We find compelling the statements made by CVI during reexamination of the '955 patent to overcome Tura LP's arguments that Figure 4 of Mercier rendered claim 1 obvious. As seen above, CVI responded that "Figure 2H of the '955 patent shows how the *work-hardened pseudoelastic material* covered by claim 1 will behave at temperatures between Ms and Md and it can clearly be seen that the material is totally elastic when a stress of about 115 ksi is applied and removed." CVI continued that "[t]he sample of Mercier shown in Figure 4 clearly does not exhibit the properties shown in Figure 2H of the '955 patent when a load of 1150

$N/mm^2$ is applied and removed." In our view, this statement could hardly be clearer. The only meaning we are able to draw from it is that CVI was telling the examiner, "Claim 1 relates to an eyeglass frame component where there is total spring back to zero after the removal of a deforming force, as seen in Figure 2H of the patent. That is not what is shown in Figure 4 of Mercier, because that figure shows 3% retained strain." That also is the thrust of CVI's additional statement that "[t]he 8.1% elasticity shown in Figure 4 of Mercier comes at the expense of a 3% retained strain, that is, the material will not return to its original shape." In addition, CVI emphasized to the examiner that an eyeglass frame which was "deformed by 3% strain" would be "of no value" even if, as depicted in Figure 4 of Mercier, it exhibited "8.1% elasticity."

In support of its claim construction, CVI/Marchon points to claim 5. It argues that, as used in claim 5 in both the '112 and the '955 patents, the term "at least 3% elasticity" cannot require "full recovery." This is so, CVI/Marchon asserts, because claim 5 shows a combination of "3% heat-recoverable shape-memory" and "3% elasticity." Put another way, if a component is stretched and then does not recover through its "elasticity" alone, unaided by "heat-recoverable shape-memory," then necessarily "elasticity" cannot mean full recovery, as Tura urges. According to CVI/Marchon, claim 5 and the related portions of the '955 specification thus provide support for its argument with respect to the construction of claim 1 of the patents.

This argument is flawed. First, CVI/Marchon's proffered meaning of "elasticity" is squarely at odds with the meaning of the term that emerges from our examination of the specifications and the prosecution and reexamination histories, as detailed above. CVI/Marchon cannot now turn its back on the meaning of "elasticity" which it embraced for claim 1

during the prosecution of the '112 patent and during the reexamination proceeding relating to the '955 patent. At the same time, we are obliged to construe the term "elasticity" consistently throughout the claims. *See Fonar Corp. v. Johnson & Johnson*, 821 F.2d 627, 632, 3 USPQ.2d 1109, 1113 (Fed. Cir. 1987) (the meaning of a term in a claim must be defined in an manner that is consistent with its appearance in other claims in the same patent).

Moreover, contrary to CVI/Marchon's suggestion, it is not inconsistent to have "elasticity," as it appears in claim 5 of both patents ("at least 3% elasticity"), mean total recovery. The eyeglass frame of claim 5 is different from the frame of claim 1. Taking the '955 patent, the frame of claim 1 is in "the work-hardened pseudoelastic metallurgical state." It must show complete recovery from "greater than" 3% strain "over a temperature range from -20°C. to +40°C." The elastic properties of a claim 1 frame are depicted in Figure 2H of the '955 specification. In Figure 2H, the temperature range limitation is indicated by the symbol $M_s < T_2 < M_d$, where $M_s$ and $M_d$ represent the lower and upper ends of the useful ambient temperature range, respectively. According to the inventors, claim 1 frames embody the concept of "optimized elasticity."

The frame of claim 5, on the other hand, is in "the work-hardened and heat-treated condition." It must show "a minimum of 3% heat-recoverable shape-memory, a yield strength greater than 30,000 psi and at least 3% elasticity." The elastic properties of a claim 5 frame are depicted in Figure 2G of the '955 specification. Figure 2G shows "a combination of elastic and shape-memory properties" at the low end of the useful ambient temperature range ($T < M_s$). '112, col. 3, lines 23-24; '955, col. 3, lines 47-50. During the prosecution of the '112 patent, the inventors stated that "[t]he memory plus elasticity embodiment [of the invention]

is shown in Figure 2G." The inventors continued by describing the advantage which flows from having heat-recoverable shape-memory in addition to work-hardening: "Conversely, if the same material were left in a fully work-hardened condition, the properties shown in Fig. 2F would result, and the component would be very springy but would not give a complete shape-memory recovery if deformed past the component's elastic limit." (Figure 2F shows stress at $T < M_s$.) In short, the heat-recoverable shape-memory limitation of claim 5 speaks to the situation in which an alloy is stressed to the point that its inherent elasticity is not enough to enable it to return to its original shape when the deforming force is removed. In other words, the alloy's elastic limit is exceeded. As noted above, this retained strain is seen in the examples in the '955 specification which discuss the embodiment of claim 5. That is not the case in claim 1. As CVI stated during reexamination of the '955 patent, "[t]he elasticity set forth in Claim 1 is attainable prior to the onset of permanent deformation."

A claim 5 component has two distinct attributes at $T < M_s$, elasticity and heat-recoverable shape-memory. Thus, the component can fully recover its original shape if it is subjected to a deforming force which stretches it up to 3% of its original length. Up to that point, only the component's elasticity properties are in evidence. If, however, the component is subjected to a deforming force which stretches it more than 3% of its original length, so that its elastic limit is exceeded, as in the examples in the '955 specification, it draws on its shape-memory properties when heat is applied, thereby enabling it to return to its original shape. The meaning given to "elasticity" by the inventors works in both claims 1 and 5.

Finally, our interpretation of the claims is consistent with and furthers the purpose of the invention. Eyeglass frames normally are carefully fitted to the wearer's particular facial configuration. If the fit is not correct, the eyeglasses are unlikely to perform their vision-correcting function properly or to be comfortable or acceptable to the wearer. When the shape of the frames is suddenly altered, such as by dropping them or sitting on them, distortion of the shape makes the frames less useful or attractive to the wearer. A frame whose elasticity enables it to correct the entire change by returning the frame to its original shape would be the most useful and most desired by the wearer. In these circumstances, it is reasonable to conclude that the references to 3% and 4% "elasticity" in the claims was intended to describe an eyeglass frame that would have that desirable and important property. In construing claims, the problem the inventor was attempting to solve, as discerned from the specification and the prosecution history, is a relevant consideration. *See Applied Materials v. Advanced Semiconductor Materials*, 98 F.3d 1563, 1573, 40 USPQ.2d 1481, 1488 (Fed.Cir.1996).[7]

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[7] In *CVI/Beta Ventures, Inc.* v. *Custom Optical Frames, Inc.*, Nos. 96-1070, 95-1486, 1996 WL 338388 (Fed.Cir. June 19, 1996), a different panel of this court, in a nonprecedential opinion, upheld the grant of a preliminary injunction against infringement of the '112 and '955 patents. *See CVI/Beta Ventures, Inc.* v. *Custom Optical Frames, Inc.*, 893 F.Supp. 508 (D. Md. 1995). In so doing, the panel affirmed an interpretation of the 3% elasticity limitation which did not restrict the claim to complete recovery. In its opinion, the panel stated that it could not conclude "in the context of the preliminary injunction proceedings that the district court erred in rejecting Custom Optical's proffered claim construction." The panel noted, as well, that the parties would have the opportunity at the merits stage to expand their arguments and to present any additional arguments. In this appeal, we review a different trial court's final claim construction as part of our review of the judgment on infringement. Therefore, unlike the earlier appeal, this appeal required us to construe the asserted claims based upon the final and complete record in the case. *See*

## IV.

What we must decide now is whether, in view of the correct construction of the claims, we should reverse the judgment of infringement in favor of CVI/Marchon or should vacate the judgment and remand the case for a new trial on the infringement issue. For the reasons which follow, we conclude that, because of CVI/Marchon's failure of proof under the correct claim construction, Tura is entitled to a judgment of noninfringement as a matter of law.

The question before us is whether any jury could reasonably have found that the accused Tura frames infringed the claims of the '112 and '955 patents as properly construed, either literally or under the doctrine of equivalents. *Exxon Chem. Patents, Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1558, 35 USPQ.2d 1801, 1805 (Fed. Cir. 1995), *cert. denied*, --- U.S. ---, 116 S.Ct. 2554, 135 L.Ed.2d 1073 (1996). In that regard, the Supreme Court has stated that "[I]f the evidence presented in the first trial would not suffice, as a matter of law, to support a jury verdict under the properly formulated defense, judgment could properly be entered for the respondent at once, without a new trial." *Boyle v. United Techs. Corp.*, 487 U.S. 500, 513, 108 S.Ct. 2510, 2519, 101 L.Ed.2d 442 (1988). The question of whether the evidence of record is sufficient to create an issue of fact for the jury is itself a question of law, which we decide. *Exxon*, 64 F.3d at 1559, 35 USPQ.2d at 1805.

In order for there to be infringement, each and every limitation set forth in a patent claim must be found in the

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*International Communication Materials, Inc.* v. *Ricoh Co., Ltd.*, 108 F.3d 316, 319 (Fed. Cir. 1997) ("We review only the district court's tentative claim construction and its resulting finding on the likelihood of successfully proving infringement, which form an adequate basis for our affirming its denial of the preliminary injunction.").

accused product, either literally or under the doctrine of equivalents. *Lemelson v. United States*, 752 F.2d 1538, 1551, 224 USPQ 526, 533 (Fed. Cir. 1985). The patentee bears the burden of proving infringement by a preponderance of the evidence. *Laitram Corp. v. Rexnord, Inc.*, 939 F.2d 1533, 1535, 19 USPQ.2d 1367, 1369 (Fed. Cir. 1991). For our purposes, we are concerned solely with the elasticity limitations of the claims. If those limitations are not met in the accused frames, CVI/Marchon's allegations of infringement fail.

As noted above, CVI/Marchon alleged that certain Tura frames infringed claims 1-3, 5 and 6 of both the '112 and the '955 patents. For the most part, CVI/Marchon limited its proof at trial to literal infringement. It did, however, assert infringement under the doctrine of equivalents with respect to the "greater than 4% elasticity" limitation in claims 1-3 of the '112 patent and with respect to the heat-treatment limitation in claim 5 of the patents.

On the record before us, there is no evidence that the accused Turaflex frames meet the elasticity limitations of claims 1 and 5 of the patents, as those limitations are properly construed. Turning first to the "greater than 3% elasticity" limitation of claim 1 of the '955 patent, we note that none of the accused frames, when tested, showed full recovery to its original shape after the release of stress. Indeed, Dr. Daniel Beshers, CVI/Marchon's expert witness, stated that, assuming 3% elasticity meant full recovery, "many of [the Tura frames] are not in that exact 3 percent recovery." He further testified that when the frames were tested at -20°C., the low end of the claimed temperature range, none of them showed full recovery. CVI/Marchon also failed to come forward with evidence demonstrating that the Tura frames exhibit "at least 3% elasticity" as recited in claim 5 of the '112 and the '955 patents as that limitation is

properly construed. Thus, on the record before us, no reasonable jury could find that the Tura frames literally infringe claims 1 and 5 of the patents.

In order to establish infringement under the doctrine of equivalents, CVI/Marchon must show evidence in the record to support the contention that the Tura frames exhibit the equivalent of "at least 3% elasticity" as recited in claim 5 of the patents, or "greater than 3%" or "4% elasticity" as recited in claim 1 of the '955 and the '112 patents, respectively. CVI/Marchon has failed to point to any testimony or evidence in the record regarding the technical issue of equivalency according to the proper claim construction. *See Lemelson v. General Mills, Inc.*, 968 F.2d 1202, 1208, 23 USPQ.2d 1284, 1289 (Fed. Cir. 1992) (patentee's failure at trial to identify elements in the accused device that correspond to two limitations in the claim indicates that no reasonable jury could find infringement, either literally or by equivalents). Therefore, no reasonable jury could find infringement under the doctrine of equivalents.

In the district court, CVI/Marchon was on notice that adoption of Tura's claim construction was a distinct possibility. Prior to trial, in ruling on motions for summary judgment, the court agreed with Tura that "3% elasticity" meant complete recovery to the frame's original length when the frame was subjected to 3% strain. Nevertheless, CVI/Marchon confined its proof at trial to evidence purporting to establish infringement under its construction of the claims. That construction was not accepted by the court, however, until the magistrate denied Tura's JMOL motion at the close of the evidence and declined to charge the jury in accordance with Tura's profferred instructions. Significantly, on appeal, CVI/Marchon has not advanced an alternative argument to the effect that, even under the claim construction

advanced by Tura, there is substantial evidence in support of the jury's verdict of infringement.

Under the circumstances of this case, the proper course is reversal of the judgment of infringement, rather than a vacatur of the judgment and a remand for a new trial. That is the teaching of *Exxon*. In that case, Exxon Chemical Patents, Inc. had sued Lubrizol Corporation for literal infringement of Exxon's patent relating to a lubricating oil composition. At trial, Exxon and Lubrizol advanced competing claim constructions. Exxon sought to prove infringement under Lubrizol's claim construction, not knowing which claim construction the trial court would adopt. The court charged the jury in accordance with Exxon's construction. The jury returned a verdict of infringement and Lubrizol appealed. On appeal, we determined that the correct claim construction was "but a slight variance" from that urged by Lubrizol. *Exxon*, 64 F.3d at 1560, 35 USPQ.2d at 1807. Since *Exxon* never identified the proof that the accused product infringed under Lubrizol's claim construction, we concluded that remand for a second trial was not necessary. Instead, we reversed because we concluded that no jury could reasonably find that Lubrizol's accused product literally infringed the claims of the patent as properly construed. We stated: "Exxon's error was in failure of proof as to the claimed amounts [of one of the ingredients of the lubricating oil that was the subject of the claims], without which it could not prove infringement under Lubrizol's claim meaning." *Id.* at 1561, 35 USPQ.2d at 1807.

This appeal presents an even more compelling case for reversal than *Exxon*. Here, the correct claim construction is the same as the one advanced by Tura, and CVI/Marchon has not pointed to any evidence in the record as supporting the judgment of infringement when the claims are correctly construed. Finally, on appeal, CVI/Marchon does not ask for

a new trial in the event that we agree with the claim construction urged by Tura. Under these circumstances, it is clear that Tura is entitled to a judgment of noninfringement as a matter of law.

## CONCLUSION

The elasticity limitations of independent claims 1 and 5 of the '112 and the '955 patents require full recovery after the release of stress. At the same time, there is no evidence of record based upon which a reasonable jury could find that, as correctly construed, the asserted claims (1-3, 5, and 6 of both patents) are met in the accused Tura frames, either literally or under the doctrine of equivalents. Thus, there can be no infringement. Accordingly, the judgment of infringement in favor of CVI/Marchon is reversed and the award of damages and the injunction entered against Tura are vacated. The case is remanded to the district court for entry of judgment of noninfringement in favor of Tura and for further proceedings in connection with Tura's pending counterclaims.

## COSTS

Each party shall bear its own costs.

*REVERSED* and *REMANDED*.

## APPENDIX B

NOTE: Pursuant to Fed. Cir. R. 47.6, this order is not citable as precedent. It is a public record.

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

96-1167

CVI/BETA VENTURES, INC.,
Plaintiff-Appellee,
MARCHON EYEWEAR, INC., MARCOLIN USA, INC., and ROTHANDBERG, INC.,
Plaintiffs-Appellees,
v.
TURA LP and BRODART CO.,
Defendants-Appellants,
and
ARTHUR BRODY,
Defendant, and
BRACKEN OPTICIANS,
Defendant.

ON MOTION FOR LEAVE TO SUPPLEMENT THE RECORD

Before MICHEL, Circuit Judge, FRIEDMAN, Senior Circuit Judge, and SCHALL, Circuit Judge.

SCHALL, Circuit Judge.

ORDER

The instant motion arises out of an appeal from a final judgment of the United States District Court for the Eastern District of New York in a patent infringement suit. CVI/BETA Ventures, Inc., Marchon Eyewear, Inc., Marcolin

USA, Inc., and Rothandberg, Inc. (collectively, "CVI/Marchon") sued Tura LP and Brodart Co. (collectively, "Tura") for infringement of United States Patent Nos. 4,772,112 (the '112 patent) and 4,896,955 (the '955 patent"). On May 1, 1997, we reversed the district court's judgment of infringement, vacated the award of damages and injunctive relief against Tura, and remanded the case to the district court for entry of judgment of nonfringement in favor of Tura and for futher proceedings in connection with Tura's antitrust and patent misuse counterclaims. *CVI/Beta Ventures, Inc. v. Tura L.P.*, 112 F.3d 1146, 42 USPQ.2d 1577 (Fed. Cir. 1997). CVI/Marchon has filed a petition for rehearing with a suggestion for rehearing in banc. In that connection, it has moved for leave to supplement the record to include declarations of James W. Peterson, Robert B. Zider, and John F. Krumme. Tura opposes the motion.

The Peterson, Zider, and Krumme declarations are submitted as part of an effort by CVI/Marchon to persuade us to delete an allegedly incorrect statement from our opinion. That statement appears as footnote 5 in the opinion. It reads as follows:

> The specification for the '112 patent contains a typographical error. Under the heading "DESCRIPTION OF THE PREFERRED EMBODIMENT," the reference in column 4 at line 64 to "FIG. 2g" should be to "FIG. 2f." This is clear from the context.

112 F.3d at 1153, 42 USPQ.2d at 1582.

Mr. Peterson was the principal patent attorney responsible for the preparation and prosecution of the '112 and '955 patents. Messrs. Zider and Krumme are the inventors named on the two patents. In their declarations, all three individuals

state that the reference to FIG. 2g at line 64 of column 4 of the '112 patent is not a typographical error.

CVI/Marchon's motion is made pursuant to Rule 10(e) of the Federal Rules of Appellate Procedure, which provides as follows:

> If any difference arises as to whether the record truly discloses what occurred in the district court, the difference shall be submitted to and settled by that court and the record made to conform to the truth. If anything material to either party is omitted from the record by error or accident or is misstated therein, the parties by stipulation, or the district court either before or after the record is transmitted to the court of appeals, or the court of appeals, on proper suggestion or of its own initiative, may direct that the omission or misstatement be corrected, and if necessary that a supplemental record be certified and transmitted. All other questions as to the form and content of the record shall be presented to the court of appeals.

Rule 10(e) cannot be used to add to or enlarge the record on appeal to include new material which was not before the district court. *United States v. Walker*, 601 F.2d 1051, 1054 (9th Cir. 1979). Indeed, by its terms, the rule only applies if "anything material to either party is omitted from the record by error or accident or is misstated therein." In its motion to supplement the record, CVI/Marchon has not alleged that the Peterson, Zider, and Krumme declarations were omitted from the record by error or accident or that there is a misstatement in the record that must be corrected.

It has been held that "[w]hen the interests of justice demand it, an appellate court may order the record of a case enlarged." *Dakota Indus., Inc. v. Dakota Sportswear, Inc.*,

988 F.2d 61, 63 (8th Cir. 1993). However, "[t]his authority to enlarge a record is rarely exercised and is a narrow exception to the general rule that an appellate court may consider only the record made before the district court." *Id.*

Tura raised the typographical error issue in its renewed motion for judgment as a matter of law after trial. CVI/Marchon did not, in response, seek to add the Peterson, Zider, and Krumme declarations to the record. Neither did CVI/Marchon seek to add the declarations to the record after Tura raised the issue again in its opening brief on appeal. Finally, in responding CVI/Marchon's motion, Tura has submitted the declaration of David L. Harris. In his declaration, Mr. Harris states that he was lead counsel for Tura in the district court. He asserts: "At the time of trial, ... I asked CVI/Beta's trial counsel ... to produce Mr. Peterson so that he could be examined by me as to the prosecution of the '112 and '955 patents and the meaning of the patents, and was told that Mr. Peterson was not an employee or agent within the control of CVI/Beta, and that he would not voluntarily be produced by CVI/Beta to testify." Tura's response to CVI/Marchon's motion to supplement the record was filed on June 10, 1997. In the interim, CVI/Marchon has not sought to challenge the statement by Mr. Harris that is quoted above.

Based upon the foregoing, we conclude that CVI/Marchon had ample opportunity, as well as the ability, before now, to seek to supplement the record in order to address the typographical error issue. The interests of justice do not demand that the record be enlarged.

Accordingly, it is hereby ordered that CVI/Marchon's motion for leave to supplement the record by DENIED.

FOR THE COURT

JUL 18, 1997
[DATE]

ALVIN A. SCHALL /S/
CIRCUIT JUDGE

## APPENDIX C

NOTE: Pursuant to Fed. Cir. R. 47.6, this order is not citable as precedent. It is a public record.

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

96-1167

CVI/BETA VENTURES, INC.,
Plaintiff-Appellee,
MARCHON EYEWEAR, INC., MARCOLIN USA, INC., and ROTHANDBERG, INC.,
Plaintiffs-Appellees,
v.
TURA LP and BRODART CO.,
Defendants-Appellants,
and
ARTHUR BRODY,
Defendant, and
BRACKEN OPTICIANS,
Defendant.

ON MOTION TO SUSPEND INJUNCTION

Before MICHEL, Circuit Judge, FRIEDMAN, Senior Circuit Judge, and SCHALL, Circuit Judge.

SCHALL, Circuit Judge.

ORDER

Pursuant to Rule 8(a) of the Federal Rules of Appellate Procedure, Tura LP and Brodart Co. have moved for an order immediately suspending the injunction entered by the district court by order dated November 13, 1995, as modified on November 29 and 30, 1995. Upon consideration of the

motion and the response thereto, it is hereby ordered that Tura's motion be GRANTED. It is further hereby ordered that the injunction be SUSPENDED.

FOR THE COURT

JUL 18, 1997 ALVIN A. SCHALL /S/
[DATE] CIRCUIT JUDGE

## APPENDIX D

CVI/BETA VENTURES, INC., Plaintiff,
v.
TURA LP, Brodart Co. and Bracken Opticians, Defendants.

MARCHON EYEWEAR, INC., Marcolin U.S.A., Inc., and Rothandberg, Inc., Plaintiffs,
v.
TURA LP, Brodart Co. and Arthur Brody, Defendants.

No. 91-CV-1710(SMG).

United States District Court, E.D. New York.

Nov. 13, 1995.

As Amended Nov. 29, 1995.

James J. Maune, Brumbaugh, Graves, Donohue & Raymond, New York City, for Plaintiffs CVI/Beta Ventures, Inc.

Edgar H. Haug, Curtis, Morris & Safford, P.C., New York City, for Plaintiffs Marchon Eyewear, et al.

Steven B. Pokitilow, Stroock Stroo k & Lavan, New York City, for Defendants Tura LP, et al.

***MEMORANDUM AND ORDER***

GOLD, United States Magistrate Judge.

## INTRODUCTION

Plaintiffs CVI/Beta Ventures, Inc. ("CVI/Beta") and Marchon Eyewear, Inc., Marcolin U.S.A., Inc., and Rothandberg, Inc. (collectively referred to herein as "Marchon") bring this action, charging that defendants Tura LP ("Tura"), Brodart Co. ("Brodart") and Arthur Brody ("Brody") (collectively referred to herein as the "Tura defendants") infringed two patents: United States Patent 4,772,112 (the " '112 patent") and United States Patent 4,896,955 (the " '955 patent"). The '112 patent was issued on September 20, 1988. On January 30, 1990, the '955 patent was issued as a continuation-in-part of the '112 patent. The two patents in suit claim an eyeglass frame with components made from nickel-titanium based shape-memory alloys having highly elastic properties.

Plaintiff CVI/Beta is the assignee, and plaintiff Marchon the licensee, of the suit patents. Plaintiffs contend in this action that Tura sold eyeglass frames which infringe both the '112 and the '955 patents, and that defendants Brodart and Brody induced Tura's infringement. Defendants contend that the patents are invalid and were not infringed, and have in addition asserted counterclaims under the antitrust laws.

This case was tried to a jury beginning on November 30, 1994. On December 22, 1994, the jury returned a verdict finding that the suit patents were valid, that defendant Tura infringed the patents but did not do so willfully, and that defendants Brodart and Brody induced Tura's infringement. The jury awarded plaintiff Marchon $14,085,093 in compensatory damages, representing $2,944,024 in profits on lost sales, $9,641,069 in profits lost as a result of depressed prices, and $1,500,000 in attorney's fees. The jury awarded plaintiff CVI/Beta $3,319,000, comprised of $819,000 in lost royalties and $2,500,000 in attorney's fees.

Several matters are currently pending before the Court. Defendants have moved for judgment as a matter of law pursuant to Federal Rule of Civil Procedure 50 or, in the alternative, for a new trial pursuant to Federal Rule of Civil Procedure 59. In addition, defendant Brody seeks dismissal, asserting that venue is not properly asserted over him in this district. Finally, the parties dispute the provisions appropriately included in a final judgment and order.

## DISCUSSION

### I. *Construction of the Claim Term "3% Elasticity"*

Defendants first assert that they are entitled to judgment as a matter of law that the accused eyeglass frames, marketed under the name Turaflex, do not infringe the patents in suit because they do not meet the elasticity requirements of the patent claims. This aspect of defendants' motion hinges upon the meaning of the terms "3% elasticity" and "4% elasticity" as used in claims 1 and 5 of the suit patents.

#### A. Background of the Dispute

The term "3% elasticity" appears in claims 1 and 5 of the '955 patent and in claim 5 of the '112 patent. The term "4% elasticity" appears in claim 1 of the '112 patent. Claim 1 of the '955 patent describes

> an eyeglass frame having at least a portion thereof fabricated from nickel-titanium based shape-memory alloy, said portion being in the work-hardened pseudo-elastic metallurgical state, said portion having been subjected to work-hardening and having a low effective elastic modulus giving a soft, springy feel, said **portion having greater than 3% elasticity** over a temperature range from -20°C to +40°C.

955:13:33 — 14:5 (emphasis added).[1] Claim 1 of the '112 patent is similar in all material respects, but refers to 4%, rather than 3%, elasticity. 112:12:14-22. Claim 5 as it appears in both the '112 and '955 patents describes

> [a]n eyeglass frame having at least a portion thereof fabricated from nickel-titanium based shape-memory alloy, ... and having a minimum of 3% heat-recoverable shape-memory, a yield strength greater than 30,000 psi **and at least 3% elasticity.**

112:12:33-41; 955:14:16-24 (emphasis added). The primary dispute between the parties concerns the meaning to be attributed to the terms "3% elasticity" and "4% elasticity," particularly in connection with the construction of Claim 1 as it appears in the suit patents. For purposes of this decision, the parties' dispute is discussed in the context of the construction to be given the term "3% elasticity."

Each party has advanced a different interpretation of the claim term "3% elasticity." Plaintiffs assert that "elasticity" describes "the ability or tendency of a given material to recover or 'spring-back' to its original shape, partially or completely, after a deforming force is removed." Pl.Mem. at 9.[2] Defendants argue that the term elasticity describes the ability of a material to return completely and spontaneously

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[1] The citation in the text is to the '955 patent at column 13, line 33 to column 14, line 5.

[2] "Pl.Mem." refers to Plaintiffs' Opposition to Defendants' Motion for Judgment As A Matter Of Law Or In The Alternative For A New Trial. "Def.Mem." refers to Defendants' Memorandum of Law In Support Of The Defendants' Motion for Judgment As A Matter Of Law Or In The Alternative For A New Trial, and "Def. Reply" refers to Defendants' Reply Memorandum In Further Support Of The Defendants' Motion for Judgment As A Matter Of Law Or In The Alternative For A New Trial.

to its precise original shape after a deforming force is released. Def.Mem. at 5.

As demonstrated by the undisputed evidence at trial, metallurgists use specific techniques for measuring the elasticity of metals. Simply put, the metal being tested for elasticity is pulled, and the pulling force, or stress, is then released. Measurements are made of the degree to which the metal is strained, or stretches when pulled, and the degree to which it recovers from that strain, or returns to its original shape, after the stress is released.

The parties agree that data developed by applying these measurement techniques are typically expressed in graphic form. These graphic depictions of elasticity are referred to as stress-strain curves. The stress to which the metal being tested is subjected, or the force with which it is pulled, is measured on the vertical axis of a stress-strain curve. The horizontal axis is used to plot the strain which the metal being tested exhibits at any given amount of force, or the degree to which it stretches when pulled and returns to its original shape when the pulling force is reduced or released. The strain is measured as a percentage of the tested item's original length. For example, a metal rod 100 centimeters long which stretches to 103 centimeters when pulled with 1000 pounds per square inch of force is said to exhibit 3% strain when subjected to a stress of 1000 pounds per square inch. Similarly, if the same rod, when pulled with a force of 1200 pounds per square inch stretched to 105 centimeters, the rod would be said to exhibit 5% strain when subjected to a stress of 1200 pounds per square inch. These percentages are calculated by dividing the change in the length of the rod (3 centimeters and 5 centimeters, respectively) by the original length of the rod, which in this example is 100 centimeters.

The difference in the definitions of elasticity advanced by the parties concerns the behavior exhibited when the stresses

on the rod are released. Plaintiffs assert that the term 3% elasticity refers to the ability of a metal item to "spring back" or recover in an amount equal to 3% of its original length after being subjected to stress. For example, to exhibit 3% elasticity as interpreted by plaintiffs, a metal rod 100 centimeters in length, after being stretched to a length of 105 centimeters when stressed, must, when the stress is released, "spring back" by an amount equal to 3% of its original length, or 3 centimeters, to a length of 102 centimeters.

According to defendants, 3% elasticity requires that a metal item return precisely to its original shape after being strained by at least 3% of its original length. In other words, to exhibit 3% elasticity as interpreted by defendants, a rod 100 centimeters in length, after being stretched to a length of 103 centimeters when stressed, would be required to recover fully and return spontaneously to its original length of 100 centimeters when the stress was released. (The behavior of the rod upon the release of stress after having been pulled to 105 centimeters is irrelevant to defendants' interpretation.) In contrast, while plaintiffs' definition would encompass full recovery from a 3% strain as one example of 3% elasticity, plaintiffs contend that any "springing back" of at least 3%, whether or not the component returns to its original shape, is sufficient to meet this element of the patent claims.

Prior to trial, plaintiffs moved for summary judgment on infringement and asserted, among other things, that defendants' frames exhibited more than 3% elasticity over the sixty-degree temperature range required by claim 1 of the suit patents. By Memorandum and Order dated November 21, 1994, this Court denied plaintiffs' motion for summary judgment, and permitted the parties to proceed to trial and argue their competing contentions about the meaning of the disputed claim term to the jury. The verdict returned after

trial indicates that the jury accepted plaintiffs' definition of the term.

After the trial of this case, the Federal Circuit issued its decision in *Markman v. Westview Instruments, Inc.*, 52 F.3d 967 (Fed. Cir. 1995), *cert. granted*, --- U.S. ----, 116 S.Ct. 40, 132 L.Ed.2d 921 (1995). The Court held in *Markman* that it was improper to allow a jury to decide the meaning of disputed claim terms. Although the Court in *Markman* acknowledged that some of its prior holdings indicated that "claim construction may have underlying factual inquiries that must be submitted to a jury," 52 F.3d at 976, it nevertheless held that the meaning of a patent claim is a question of law and, as such, must be resolved by the Court.

This Court's Memorandum and Order denying plaintiffs' motion for summary judgment on infringement addressed the parties' dispute over the meaning of the term 3% elasticity. After reviewing the specifications and the prosecution history of the suit patents, the definition advanced by defendants was determined to be correct. As this Court has made clear in the course of prior proceedings in this action, however, because the decision was to deny summary judgment, it has little or no precedential significance. Moreover, since rendering that decision, the Court has had the opportunity to review the specifications and prosecution history at great length, to hear testimony from experts about the meaning of technical terms, including elasticity, and to consider additional arguments made by the parties, both at trial and in connection with the motions now pending. Accordingly, the meaning of the patent terms in dispute is now reviewed *de novo*, without regard or reference to the discussion in the Memorandum and Order issued prior to trial.

The Federal Circuit's decision in *Markman*, which now requires this Court to decide the meaning of the claims in the patents in suit, offers guidance to Courts attempting to

construe technical terms in a patent claim. The primary sources for determining the meaning of a patent claim are the claim language itself, the patent specification and the prosecution history. In addition, the Court in *Markman* specifically held that "expert and inventor testimony ... may be helpful to explain scientific principles, the meaning of technical terms, and terms of art that appear in the patent and prosecution history." 52 F.3d at 979-81.

**B. The Language of the Patent Claims**

The claims of the suit patents, quoted above, use the terms 3% elasticity and 4% elasticity without elaboration. Accordingly, standing alone, the language of the patent claims is of no assistance in resolving the definitional dispute between the parties.

Defendants assert that the commonly understood ordinary meaning of the term "elasticity" supports the definition they advance. In their memorandum, defendants recount the trial testimony of several witnesses, including John Krumme, Dr. Daniel Beshers, and Yuichi Suzuki, each of whom presented their own interpretation of elasticity. Def.Mem. at 6 n.6. Defendants assert that the testimony cited in their memorandum establishes that the term elasticity is typically used to refer to the ability of a strained material to return to its original shape when the stress causing the strain is removed.

The testimony relied upon by defendants, however, is taken out of context. Krumme, one of the two inventors, and Beshers, plaintiffs' trial expert, testified that the term elasticity, particularly when used in the context of shape memory alloys like those described in the suit patents, refers to the ability of material to spring back towards its original shape, and not necessarily to return precisely to its original dimensions. Tr. 571 (Krumme), 966-67, 1207 (Beshers).

Even Suzuki, who was called as a witness on behalf of the defendants at trial, described elasticity as "mean[ing] that the recovery power for it to return to its original shape is extremely great." Tr. 1640-41. Suzuki's definition suggests that materials with great, but not necessarily complete, power to return to their original shape nevertheless exhibit elasticity.

More importantly, the real issue of claim interpretation presented by this case is not the meaning of elasticity in the abstract, but rather the meaning of a measure of elasticity expressed as a percentage. In other words, whatever elasticity may mean, the term 3% elasticity clearly means something less than, for example, 100% elasticity. Thus, even assuming that defendants are correct in their assertion that the term elasticity refers in general to the ability of a material to return to its original shape, the question of what behavior constitutes 3% elasticity remains.

### C. The Specifications of the Patents in Suit

As discussed above, elasticity measurements are frequently displayed in graphic form as stress-strain curves. The suit patents contain several such curves, labelled as figures 2A through 2H.[3] The parties each contend that the graphs contained in the suit patents, as well as the patent specifications,[4] support their respective definitions of the term 3% elasticity.

Defendants point in particular to figures 2F and 2H, and to passages taken from the specifications indicating that these graphs illustrate the properties of the invention described in claim 1 of the suit patents. Figures 2F and 2H depict

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[3] The same graphs appear in both the '112 and '955 patents.

[4] The term "specifications" is used in the plural to refer to the specifications of both the '112 and '955 patents.

materials which, having been strained by approximately 6% of their original length, return completely to their original shape when the stress upon them is released. The use of these figures in the patent specifications thus lends strong support to defendants' definition of the term 3% elasticity. Defendants further correctly assert that the patent specifications suggest that the behavior illustrated in figures 2F and 2H — spontaneous return precisely to original shape from strains of up to 6% — can be achieved by the claimed invention at temperatures as low as -20°C.

While it is certainly appropriate to consider a patent specification when construing a disputed claim term, it is not proper to read limitations into a claim from the specification. *SRI Int'l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1121 (Fed.Cir.1985); *see also Markman*, 52 F.3d at 980 (noting that the specification "does not delimit the right to exclude. That is the function and purpose of the patent claims."); *Electro Medical Sys. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994) (holding that "claims are not to be interpreted by adding limitations appearing only in the specification"). Figures 2F and 2H are therefore relevant only insofar as they inform the meaning of the term "3% elasticity," and not simply because the patent specifications in the suit patents suggest — even if inaccurately — that the behavior which these curves illustrate can be achieved by the claimed invention.[5]

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[5] In considering whether the discussion of figures 2F and 2H in the specifications inaccurately implies that the claimed invention can achieve a spontaneous return to original shape from 6% strains over a sixty-degree temperature range, it should be noted that the specifications state that figures 2F and 2H represent "ideal characteristics." 112:4:45-46; 955:5:19.

For this reason, it is particularly noteworthy that the specifications do not describe figures 2F and 2H as illustrating 6% elasticity.[6] Rather, in the course of discussing a particular embodiment of the claimed invention, the specifications assert that these figures depict a "component [which] acts *completely elastically* up to strains of 6% or more." 112:5:25-26; 955:6:2-3 (emphasis added). Similarly, in connection with another embodiment, the specification of the '955 patent refers to a component which can be subjected to a "4% tensile strain and show *complete elastic spring back* at room temperature." 955:6:12-14 (emphasis added). Using the language of the specifications, then, had the inventors intended to use the term elasticity as defendants argue, they would have written a claim requiring that a component behave "completely elastically" or exhibit "complete elastic spring back" when subjected to stresses causing strains of at least 3% of original length. For these reasons, this Court cannot agree that figures 2F and 2H, and the discussion of them in the specifications, compels the conclusion that 3% elasticity requires that a component return spontaneously and completely to its original shape.

In fact, when carefully reviewed in their entirety, the specifications and figures in the suit patents in fact provide persuasive support for plaintiffs' definition of 3% elasticity. This support derives in particular from the language of claim 5 and the discussion of figure 2G in the specifications. In both the '112 and '955 patents, claim 5 uses the same term —

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[6] Although there is a mention of the term "6% elasticity" at 955:6:24, it is clear from the context that this term is not being used to refer to the behavior depicted in figures 2F and 2H. Moreover, the complete phrase, "greater than 6% elasticity," could not possibly be describing the behavior shown in figures 2F and 2H, because these figures illustrate behavior which, even by defendants' definition, would constitute slightly less than 6% elasticity.

"3% elasticity" — which appears in claim 1 of the '955 patent.[7] When describing the behavior constituting 3% elasticity in the context of claim 5, the specifications use this term precisely as do plaintiffs in connection with the motions now pending before the Court. For example, the '112 patent describes an embodiment of claim 5 which provides "a fully recoverable strain potential of at least 6%." 112:5:45-46. In the text immediately following, it is further explained that this 6% recovery is comprised of "a minimum of 3% heat-recoverable shape-memory ... and at least 3% elasticity." 112:5:53-55. Thus, the '112 patent specification describes a component as exhibiting 3% elasticity even though the component retains a 3% strain recoverable only with the application of heat.

Similarly, the '955 patent, in discussing an embodiment of claim 5, describes a component which has been subjected to a 7.5% strain. This strain is completely recovered when, "upon unloading[,] the component gives 3.7% elastic spring back and imparts 3.8% shape memory recovery when heated." 955:6:60-62. The specification further states that "[f]rom the above, it can be seen [that eyeglass frame components may be made] ... having a minimum of 3% heat-recoverable shape-memory ... and at least 3% elasticity." 955:7:10-14. The reference to "3.7% elastic spring back" is the only behavior described in the text which could possibly support the conclusion that "from the above ... 3% elasticity [can be seen]." A second embodiment of claim 5 using similar language and providing similar support for the definition of 3% elasticity advanced by plaintiff is described at 955:6:63-955:7:9.

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[7] As noted above, claim 1 of the '112 patent uses the term "4% elasticity," but is in all other material respects identical to claim 1 of the '955 patent.

Clearly, then, the 3% elasticity described in the cited text of the '112 patent, and the 3.7% "elastic spring back" described in the cited text of the '955 patent, are provided as examples of the 3% elasticity required by claim 5. It is also clear that this elastic behavior must be combined with at least 3% "heat-recoverable shape-memory" behavior before the components, having been subjected to strains of 6% and 7.5%, respectively, return to their original shape. Thus, the term "3% elasticity," as it is used in claim 5, plainly does not require that a component return spontaneously and completely to its original shape. The same claim term, 3% elasticity, is of course used in claim 1, and cannot be consistently construed to require that a component spontaneously return to zero.

Defendants contend that the portions of the specifications discussed above do not support plaintiffs' definition of 3% elasticity. Rather, according to defendants, the heat-recoverable shape-memory and elasticity described in claim 5 are separate and distinct characteristics, each of which must be measured independently by straining a component to about 3% of its original length.

The cited portions of the specifications discussed above, however, demonstrate that the shape-memory and elasticity components of claim 5 are intended to operate in tandem upon an eyeglass frame subjected to strains in excess of 6% of original length. This construction of the shape-memory and elasticity elements of claim 5 is further supported by the references to figure 2G in the specifications of the suit patents. Figure 2G depicts a component which has been strained slightly less than 8%. When the deforming stress is released, the component springs back by almost 5%, with a strain of about 3% remaining. This remaining 3% strain is then recovered with heat, which returns the component to its original shape. Consistent with plaintiffs' definition of the

term 3% elasticity, the specifications describe the "spring back" of 5%, from 8% strain to the remaining 3% strain, as illustrating the component's elastic properties. 112:3:23-24; 955:3:47-48. Furthermore, the specifications make it clear that figure 2G is intended to illustrate the behavior of a component covered by claim 5. 955:6:26, 35.

As discussed above, the '955 specification uses the phrase "spring back" to describe the behavior of a component which meets the requirement of 3% elasticity in claim 5. Moreover, the suit patents each employ figure 2G, which illustrates only a partial return toward original shape absent heat, to depict the "at least 3% elasticity" described in claim 5. It therefore follows that the term 3% elasticity as used in claim 5 refers not to the spontaneous return of a component to its original shape, but rather to the ability of a component to "spring back" by an amount equal to 3% of its original length. Moreover, the term is used in claim 5 precisely as it is used in claim 1, and there is no reasoned basis to apply different definitions to the same term used in two claims of the same patent. *See Southwall Technologies, Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1579 (Fed.Cir.1995), *petition for cert. filed*, 60 U.S.L.W. 3250 (Sept. 19, 1995) (No. 95-475); *Fromson v. Advance Offset Plate, Inc.*, 720 F.2d 1565, 1570 (Fed. Cir. 1983) (holding that "evidence of the scope of a particular claim can be found on review of other claims"). This Court concludes, therefore, that the specifications support plaintiffs' contention that the 3% elasticity requirement in the claims of the suit patents is satisfied by a component which, upon the application of force, is strained in excess of 3% of its original length, and which, when the deforming force is released, springs back by at least 3% of its original length.

**D. The Prosecution History**

Defendants next assert that the prosecution history of the suit patents supports their definition of 3% elasticity. Like a

patent specification, a patent's prosecution history may properly be considered when construing the language of a claim, but may not be used to vary the claim's limitations. *Markman*, 52 F.3d at 980. Accordingly, as with the specifications, the prosecution history is relevant only insofar as it indicates how the term "3% elasticity" was defined by the inventors and understood by the Patent and Trademark Office (the "PTO"). To the extent the inventors asserted during the prosecution history that their invention could achieve results even more impressive than those described in the patent's claims, such assertions, whether accurate or not, are not in and of themselves relevant to the claim construction question defendants now raise.

Defendants rely upon cited passages from several documents generated during the prosecution history in which the inventors emphasized the highly elastic properties claimed for their invention by referring to figures 2F and 2H and to the term "optimized elasticity." Defendants argue that these passages demonstrate that the inventors attempted to persuade the patent examiners that frames made pursuant to their patent would spontaneously return to their original shape when a deforming stress was released.

The documents cited by defendants, however, do not purport to define the claim term 3% elasticity or otherwise express a measure of elasticity in percentage terms.[8] Indeed,

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[8] Defendants argue that the inventors used the term optimized elasticity to mean the same thing as pseudoelasticity, and defined pseudoelasticity as the spontaneous return to original shape. Defendants correctly describe the inventors' definition of pseudoelasticity. 955:1:48-55. Defendants' contention that the inventors used optimized elasticity to mean the same thing as pseudoelasticity, however, is incorrect. The '955 patent specification specifically states that optimized elasticity is achieved by combining the pseudoelastic and superelastic properties of shape-memory alloys, and emphasizes that the terms pseudoelasticity and superelasticity

when describing pseudoelastic behavior, the inventors did not refer to a percentage of elasticity, but instead used the phrase, "the strain will spontaneously return to zero." PX 3 at 14.[9] Similarly, when describing the behavior depicted in figure 2H during the prosecution history, the inventors did not describe that figure as illustrating 6% elasticity, but rather as depicting the behavior of "totally elastic" material. *Id.* Thus, when describing the ability of an item to return to its original shape — a behavior characteristic of pseudoelasticity and depicted in figure 2H — the inventors used terminology, such as spontaneous return to zero or total elasticity, which does not express elasticity as a percentage. The terms used by the inventors during the prosecution history thus support the conclusion that the claim terms, which do express elasticity as a percentage, do not require the complete and spontaneous return of an item to its original shape.

The only discussion of elasticity expressed in percentage terms which the Court has found among the prosecution history documents cited by the parties supports plaintiffs' definition of the term 3% elasticity. In a request for reexamination, the inventors discussed a prior art reference

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refer to different properties. 955:1:36-44; 955:2:29-33. Similarly, at least once during the prosecution history, the inventors described optimized elasticity as a combination of pseudoelasticity at higher temperatures and other properties at lower temperatures. This is reflected in a document cited by defendants, in which the inventors discussed

> the optimized elasticity combination of properties which utilize the soft pseudoelastic effect in concert with a resistance to turning weak and staying bent when deformed at a temperature below the material's transformation temperature.

DX 17B at 6-7.

[9] PX 3 refers to plaintiffs' trial exhibit 3. DX is used herein to refer to defendants' trial exhibits.

referred to as the "Mercier article." The inventors described a stress-strain curve in the Mercier article as illustrating a component strained by a deforming force to 11.1% which returns, or springs back, approximately 8.1% after the deforming stress is released. The request for reexamination describes this curve as illustrating 8.1% elasticity at the expense of a 3% retained strain. PX 3 at 19. (The 3% retained strain refers to the difference between the 11.1% strain to which the component was subjected and the 8.1% spring back exhibited by the component when the stress upon it was released.) Clearly, the inventors' statement to the PTO, describing a component which recovered only partially when stress was released as exhibiting 8.1% elasticity, supports plaintiffs' interpretation of 3% elasticity.

Defendants argue in their reply that the inventors' discussion of Mercier was based upon an inaccurate reading of the defendants' position during the reexamination proceeding. More specifically, defendants contend that it was their position on reexamination that the Mercier curve did not depict any retained strain. Def.Reply at 23 n. 15. Even assuming that defendants are correct in this regard, plaintiffs' misunderstanding has no bearing on the proper construction of the claim term in dispute. The significance of the statements made by the inventors during the prosecution history about the Mercier curve does not depend upon the accuracy or persuasiveness of their arguments about the curve, but instead upon the meaning attributed by the inventors to the expression of elasticity in percentage terms. It is clear that, in the passage from the prosecution history cited above, the inventors argued to the PTO that the curve in Mercier depicted a retained strain, yet nevertheless characterized that curve as illustrating 8.1% elasticity. The description of a stress-strain curve which is understood to depict a component which only partially returns to its original

shape as exhibiting 8.1% elasticity supports the definition of 3% elasticity advanced by plaintiffs.

**E. The Extrinsic Evidence At Trial**

As noted above, the Court in *Markman* specifically held that expert testimony may be helpful to explain scientific principles and the meaning of technical terms. 52 F.3d at 979-81. Dr. Daniel Beshers, who has been a professor of metallurgy and material science at Columbia University since 1957, testified for plaintiffs as an expert at trial. In the course of his testimony, Beshers stated that elasticity expressed as a percentage, particularly when discussing shape memory alloys, is widely understood to refer to the ability of a component to "spring back" upon the release of stress to a degree indicated by the percentage of elasticity stated. Tr. 966-67, 1157, 1160.[10] Beshers' expert opinion thus supports the definition of 3% elasticity advanced by plaintiffs.

Defendants argue that, because Beshers is not one of ordinary skill in the art, his expert opinion should have no bearing upon the construction of the disputed claim language. Beshers, however, testified that the definition he gave at trial was "universal" and that "everybody would agree to [it]," and that it was "widely recognized" as an accurate definition in the context of shape memory alloys. Tr. 1157, 1160. Moreover, Beshers testified that he had little experience with or specialized knowledge of shape memory alloys and their properties before he was retained by plaintiffs, he devoted special study to the subject, particularly in connection with the fabrication of eyeglass frames, after plaintiffs engaged him. Tr. 949-50, 952. Presumably, one of ordinary skill in the art — a fabricator of metal eyeglass frames lacking

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[10] The reference at Tr. 1157:21 to 97 millimeters should read "197 millimeters."

detailed familiarity with shape-memory alloys — would undertake a similar course of study and investigation. Finally, defendants offered no evidence at trial that one of ordinary skill in the art would, by virtue of training and experience, understand the term 3% elasticity differently than did Beshers.[11] Accordingly, I conclude that it is appropriate to consider Beshers' expert testimony about the meaning of the term 3% elasticity.

* * *

Based upon the language of the claims of the suit patents, the specifications and drawings they contain, the history of their prosecution and the extrinsic evidence at trial, this Court concludes that the term 3% elasticity is properly construed to refer to the behavior exhibited by a component which, when strained by a deforming force to a length in excess of 3% of its original length, springs back by at least 3% of its original length when the force is released. Defendants' contention that the evidence at trial was insufficient to support the jury's finding that their products exhibited 3% elasticity as required by claim 1 is premised upon the definition of that claim term advanced by defendants. That definition having been rejected for the reasons stated above, defendants' motion for judgment as a matter of law on this ground is denied.

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[11] The only expert testimony about the meaning of elasticity presented by the defendants at trial was the testimony of Walter Johnson. Like Beshers, Johnson had little or no experience with shape memory alloys prior to being retained in this case, and had no experience whatsoever with the fabrication of eyeglass frames. Tr. 2224-25. Accordingly, Johnson was no more one of ordinary skill in the art than was Beshers. Moreover, Johnson opined during his testimony in any event that "there [are] as many definitions of elasticity as there are metallurgists." Tr. 2236.

## II. *Elasticity and Shape-Memory Requirements of Claim 5*

Claim 5 of both the '112 and '955 patents describes an eyeglass frame with a component which has "a minimum of 3% heat-recoverable shape-memory ... and at least 3% elasticity." Defendants argue that the evidence presented at trial was insufficient to support the jury's finding that these claim elements were infringed.

Defendants' contention that the evidence at trial was insufficient to establish that the accused frames have 3% elasticity is premised upon the same construction of that claim term which is rejected in Point I of this Memorandum and Order. Accordingly, for the reasons stated above, this aspect of defendants' motion must be denied.

Defendants now assert for the first time that the evidence at trial was also insufficient with respect to the heat-recoverable shape-memory element of claim 5. In two written motions dated December 12, 1994, defendants sought a directed verdict on several specifically stated grounds. Defendants did not, however, seek judgment as a matter of law on any ground related to the "3% heat-recoverable shape memory" element of claim 5.[12] Defendants' failure to raise this basis for relief during trial bars their post-trial motion for judgment as a matter of law. *See, e.g., Lambert v. Genesee Hosp.*, 10 F.3d 46, 53-54 (2d Cir.1993), *cert. denied*, --- U.S. ---, 114 S.Ct. 1612, 128 L.Ed.2d 339 (1994) (emphasizing that the rule is designed to protect a party's

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[12] In response to plaintiffs' contention that defendants waived their right to raise the sufficiency claims they now advance (Pl.Mem. at 39-40), defendants point out that their arguments about the meaning of the term 3% elasticity as used in claim 5 were raised in their motion for a directed verdict. Def. Reply at 36. Defendants, however, point to no indication that they raised the argument they now make regarding the heat-recoverable shape-memory aspect of claim 5 during the trial.

right to "notice of potential deficiencies in its proof before the case is submitted to the jury"); Fed. R. Civ. P. 50(a), Advisory Committee's Notes to 1991 Amendment.

With respect to virtually every ground on which they seek judgment as a matter of law, defendants in their post-trial motion contend that they are entitled in the alternative to a new trial pursuant to Fed. R. Civ. P. 59. Although the failure to seek a directed verdict during trial does not procedurally bar a motion for a new trial, such a motion should be granted only to prevent manifest injustice. *See, e.g.*, *Baskin v. Hawley*, 807 F.2d 1120, 1134 (2d Cir.1986); *Russo v. State of N.Y.*, 672 F.2d 1014, 1022 (2d Cir.1982), *modified on reh'g*, 721 F.2d 410 (2d Cir.1983); 6A Moore's Federal Practice ¶ 59.08[5] at 59-150-59-152. Defendants, having failed to raise their contentions at a time when plaintiffs might have cured any asserted insufficiency in their proof, have not presented arguments which warrant granting them a new trial.

Finally, even if this Court were to reach the merits of defendants' motion with respect to heat-recoverable shape-memory, the motion would be denied. Defendants' position is premised upon a construction of this claim term which would require an accused frame component to return completely and precisely to its original shape. Def.Mem. at 33.[13] This Court has already rejected the defendants' contention that elasticity, expressed in percentage terms, requires a complete return to original shape. There is no reason to construe a statement of heat-recoverable shape-memory expressed in percentage terms any differently.

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[13] Defendants support their argument by reference to portions of the trial testimony of plaintiff's expert, Dr. Beshers. At least one of these references, however, refers to Turaflex frame Model 874. Def. Mem. at 33. Plaintiffs did not contend at trial, however, and the jury did not find, that this model infringed claim 5 of either the '112 or '955 patents.

For these reasons, defendants' motion for judgment as a matter of law, or in the alternative for a new trial, on grounds that there was insufficient proof at trial to support the jury's verdict with respect to the elasticity and heat-recoverable shape-memory elements of claim 5, is denied.

## III. *Infringement of Claims 1 and 5 by the Same Component*

The jury found that four of defendants' frames infringe both claims 1 and 5 of the suit patents. Defendants contend that these patent claims are irreconcilably inconsistent, and that any verdict finding that an accused product infringes both must therefore be set aside.

Defendants make four arguments in support of their contention that it is not logically possible for one product to infringe both claims 1 and 5 of the patents in suit. First, defendants argue that the specifications indicate that frames exhibiting the characteristics of claim 1 should be made by subjecting the frames to work-hardening and avoiding subsequent anneals, whereas frames intended to behave as described in claim 5 should be subjected to heat treatment during fabrication. Second, defendants assert that, during the prosecution of the suit patents, the inventors indicated to the PTO that the shape memory alloys best used to fabricate components intended to behave as described in claim 1 and those suitable for making frames with the characteristics listed in claim 5 have different transformation temperatures. Third, defendants point to portions of the specifications indicating that claim 1 frames have a yield strength greater than that of claim 5 frames. Finally, defendants rely upon a licensing agreement and correspondence authored by an employee of plaintiff CVI/Beta as evidence that the plaintiffs conceived of claims 1 and 5 as describing separate and distinct eyeglass frame components.

The purported inconsistencies relied upon by defendants are not irreconcilable. Claim 1 does not include an element requiring or precluding anneals or heat treatments. Neither claim 1 nor claim 5 specifies the transformation temperature of the shape memory alloy from which the patented frame component is to be fabricated. Claim 1 does not require a minimum yield strength, and claim 5 does not impose a maximum. In short, defendants' attempt to impugn the jury's findings as irreconcilably inconsistent relies upon a reading of limitations into claims 1 and 5 from the specifications and the prosecution history of the suit patents, despite the complete absence of words in the claims themselves which would support such limitations. This is plainly improper. *SRI Int'l.*, 775 F.2d at 1121; *see also Markman*, 52 F.3d at 980; *Electro Medical Sys.*, 34 F.3d at 1054. Moreover, even assuming that plaintiffs did not contemplate manufacturing or marketing frame components which exhibited the characteristics of both claims 1 and 5, this would not render the jury's verdicts irreconcilably inconsistent. An inventor's decision to exercise his patent rights by marketing separate claim-specific products in no way bars a jury from concluding that an accused product simultaneously infringes two claims of the same patent.

Defendants have failed to establish that claims 1 and 5 contain irreconcilably inconsistent terms. Accordingly, the motion to set aside the jury's verdict on this ground is denied.

## IV. *Yield Strength*

Claim 5 of the suit patents requires that a frame component have "a yield strength greater than 30,000 psi." '112:12:40-41; '955:14:24-25. Defendants argue that this claim term should be interpreted to require a component to exhibit the stated yield strength at a temperature at which 3% heat recoverable shape-memory and elasticity occurs, i.e., at -20°C, and that the evidence presented at trial was

insufficient to support the jury's finding that the Turaflex frames possessed the required yield strength at that temperature.

Defendants argued that claim 5 should be interpreted to require the stated yield strength at -20°C in their motion for a directed verdict. Defendants have not presented any evidence or posed any arguments which this Court did not thoroughly consider before denying defendants' motion for a directed verdict at the close of the evidence at trial. Tr. 2915:23- 2917:16; 2926:11-19. The reasons for denying that motion are nevertheless amplified below.

**A. Claim Construction**

Although claim 1 expressly requires that a component exhibit certain characteristics over a stated temperature range, there is simply no mention of a temperature range requirement in claim 5. In light of the temperature range requirement in claim 1, it is clear that the tendency of shape-memory alloys to behave differently at different temperatures was neither overlooked by the inventors or the PTO, nor beyond their ability to address with claim requirements. The absence in claim 5 of a limitation with respect to temperature makes it clear from the plain language of the claim terms that no such limitation was intended.

Defendants assert, however, that the specifications of the suit patents indicate that the yield strength requirement of claim 5 must be met at temperatures as low as -20°C. While it is "proper to use the specification to interpret what the patentee meant by a word of phrase in the claim," it is not proper to add "an extraneous limitation appearing in the specification." *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433 (Fed. Cir.), *cert. denied*, 488 U.S. 986, 109 S.Ct. 542, 102 L.Ed.2d 572 (1988). An extraneous limitation is one which is "read into

a claim from the specification wholly apart from any need to interpret what the patentee meant by particular words or phrases in the claim." *Id.* In other words, the language contained in the patent specifications may be used only to interpret ambiguous claim terms, and not to impose additional limitations on the claims. *See SRI Int'l.*, 775 F.2d at 1121.

In this case, the phrase "a yield strength greater than 30,000 psi" as used in claim 5 clearly makes no reference to a temperature range. Accordingly, it is not proper to look to the patent specifications to determine whether or not claim 5 requires that a component possess this yield strength at any specific temperature.

Moreover, the portions of the specifications cited by defendants do not require that an alloy possess the yield strength stated in claim 5 at temperatures as low as -20°C. Defendants rely upon a statement in the specifications that work-hardening, followed by partial annealing, results in a component that, "below $M_s$, has a combination of higher yield strength, very springy elastic behavior, and some shape-memory characteristics."[14] 955:6:31-34. Although this portion of the patent specification discusses the yield strength of an alloy below its $M_s$ temperature, there is no indication in the specification that the $M_s$ temperature referred to is as low as -20°C. Indeed, in discussing the shape memory features of the frame components for purposes of Claim 5, the specifications refer to figure 2G, which depicts the behavior of an alloy at some point below $M_s$, but in no way indicates that the alloy has an M subs temperature as low as or close to -20°C. 955:5:37-41.

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[14] $M_s$ is used in the patent specifications to refer to a transformation temperature of a shape memory alloy.

The only temperature range requirement imposed by the suit patents is the -20°C to +40°C range over which claim 1 requires that a component exhibit at least 3% elasticity. The discussion of claim 1 in the specifications of the suit patents indicates that the $M_s$ temperature does not necessarily approach -20°C. Rather, the $M_s$ temperature depends upon the alloy selected. In discussing Claim 1, the patent specifications describe the behavior of frame components at temperatures below $M_s$, which may fall above -20°C. 955:5:37-40, 50-61. Thus, even if the specifications were read to impose a limitation on claim 5, they might arguably require only that a frame component possess the stated yield strength at some temperature below $M_s$, but not necessarily at temperatures as low as -20°C.

Defendants next assert that plaintiffs implicitly conceded that Claim 5 requires an alloy to possess the stated yield strength at -20°C by seeking a finding of infringement with respect to Turaflex Model 841 under the doctrine of equivalents. The evidence at trial presented by plaintiffs established that the yield strength of this frame at -20°C was below the 30,000 psi required by claim 5. Defendants reason that, had plaintiffs asserted that claim 5 required only that the 841 possess the requisite yield strength at any temperature, plaintiffs would have sought to prove literal infringement by relying upon tests which demonstrated that Model 841 had a yield strength of 52,000 psi at 40°C. Plaintiffs' attempt to demonstrate at trial that the 841 exhibited the requisite yield strength at -20°C, however, does not compel this Court to read such a limitation into claim 5, which itself contains no reference to temperature which even arguably applies to yield strength. Accordingly, I conclude that claim 5 should not be construed to require that its stated yield strength requirement be met at -20°C.

Defendants do not challenge the sufficiency of the evidence at trial that the accused frame components possessed the required yield strength at higher temperatures, nor could they. The jury, reading the plain language of claim 5, might well have concluded that the yield strength requirement stated in claim 5 need not be met at -20°C, and relied upon Beshers' test results at higher temperatures, indicating yield strengths well in excess of 30,000 psi. PX 20.[15] These results provided ample support for the jury's finding that the accused frame components infringed the yield strength element of claim 5.

**B. Sufficiency of the Evidence**

As noted above, defendants correctly assert that plaintiffs attempted to prove at trial that the frame components accused of infringing claim 5 possessed the yield strength required by that claim at temperatures as low as -20°C. Defendants contend that the proof at trial on this issue was insufficient to support the jury's infringement finding. Even if claim 5 were interpreted to require that an alloy possess the stated yield strength at -20°C, the evidence presented at trial by plaintiffs would be sufficient to support the jury's verdict.[16]

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[15] Beshers' data at higher temperatures, with a substantial margin for error and obtained before several cycles of tests were performed, are not subject to the attack levelled by defendants, discussed below, at the results which Beshers obtained at -20°C.

[16] Plaintiffs acknowledge that Beshers' test data established that the yield strength of the Turaflex 841 at -20°C was 28,000 psi and not the 30,000 psi required under Claim 5. The jury's finding that this frame infringed the yield strength element of claim 5, however, was returned under the doctrine of equivalents, and was supported by relevant testimony of equivalence from Dr. Beshers. Tr. 1149:4-1150:4. Defendants' challenge to the propriety of submitting this issue and others to the jury under the doctrine of equivalents is addressed in Point VI of this Memorandum and Order, below.

Plaintiffs' proof of yield strength was presented through the testimony of Dr. Beshers, who described various tests he performed on the accused frame components. Defendants challenge all of Beshers' findings, and in particular those at cold temperatures. Defendants assert that Beshers' findings are unsupported and conclusory, and based upon testing techniques so flawed that no reasonable juror could have relied upon them. More specifically, defendants assert that Beshers artificially inflated the yield strength of the Turaflex samples by testing them at -20°C only after having subjected them to several tests at higher temperatures. According to defendants, these prior tests at higher temperatures themselves increased the yield strength of the tested alloy, thereby artificially inflating the results of the tests performed at -20°C.

Dr. Beshers' testimony, however, was hardly conclusory. Beshers explained the procedures he used to determine the yield strength of the Turaflex frames at great length during both his direct testimony and upon cross-examination. *See, e.g.*, Tr. 966:2-17; 980:20-992:15, 1003:6-12, 1025:21-1026:5, 1140:18-1148:10. Moreover, plaintiffs introduced into evidence the test samples and documents reflecting the test results from which Beshers calculated the yield strength of the accused Turaflex frames. PX 8-21.

The reliability of Beshers' testing procedures was addressed in detail at trial and properly submitted to the jury. Beshers testified that the repeated testing at higher temperatures emphasized by the defendants did not significantly affect his results at -20°C. When asked on cross-examination whether he was "concerned" that performing repeated tests — three cycles at room temperature, one cycle at 40°, one cycle at 0° and finally two cycles at -20°C — undermined the accuracy of his results, Beshers responded that repeated test cycling did

not change the properties of the material being tested. Tr. 1098:18-24. Even after being questioned about the differences in the tensile strengths of the sample frames after each test cycle, Beshers stood by the opinions he rendered to the jury. Beshers stated that there was nothing about the questions he was asked or the documents which he reviewed which would cause him to alter his conclusions that the Turaflex frames met the yield strength requirement of Claim 5 of the suit patents. Tr. 1206:18-1207:3.

The jury had the opportunity to consider Beshers' credentials, to observe his demeanor, and to evaluate the testing procedures he followed and the results he obtained. During his testimony, Beshers stated his opinion that the purported flaws in his test procedures relied upon by defendants did not affect the accuracy of his results. The jury was entitled to rely upon Beshers' opinion in this regard. Fed. R. Evid. 702.[17] Accordingly, even if claim 5 were interpreted to require an alloy to possess the stated yield strength at -20°C, the evidence would be sufficient to support the jury's conclusion that the accused frame components met the yield strength requirement of the patents in suit.

## V. *Work-Hardening*

### A. Construction of Claim 1 of the '955 Patent

Claim 1 of the '955 patent describes "[a]n eyeglass frame having at least a portion thereof ... in the work-hardened pseudoelastic metallurgical state, said portion having been subjected to work-hardening." 955:13:33-14:2. The parties dispute the meaning of this phrase.

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[17] Defendants support their argument by referring to the test results obtained by their expert, Walter Johnson. Clearly, however, it was within the jury's province to credit Beshers' testimony and reject the testimony provided by Johnson.

Defendants contend that this claim term should be interpreted to require work-hardening of a shape-memory alloy while it is at a temperature at which it is pseudoelastic, i.e., at a temperature between $M_s$ and $M_d$.[18] This construction of the claim would require that an alloy be subjected to work-hardening while in a particular metallurgical state, but would not require that the finished component be in any particular state of work-hardening. Plaintiffs assert that the phrase "work-hardened pseudoelastic metallurgical state" describes a final state of an alloy and not a processing step. Plaintiffs argue, therefore, that the phrase should be construed to require that a finished product exhibit residual work-hardening and, within the appropriate temperature range, exhibit the characteristics of pseudoelasticity as well.

Defendants did not move for judgment as a matter of law on this ground during the trial. Accordingly, they may not now raise this issue as a basis for such relief. Fed. R. Civ. P. 50.

Moreover, defendants' argument lacks substantive merit. The ordinary meaning of the phrase "work-hardened pseudoelastic metallurgical state" supports the interpretation advanced by plaintiffs. The term "work-hardened" modifies the term "state," and thus clearly indicates a description of a finished product in a particular state, rather than a processing step which must be performed at a specific point during the fabrication of a frame component.

This interpretation of the claim's ordinary meaning is further supported by the remaining terms of the claim. Claim 1 includes a process limitation — that the component have

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[18] $M_d$, like $M_s$, refers to a transformation temperature of a shape memory alloy.

been "subjected to work-hardening" — which appears in the claim immediately following the term in dispute. This process limitation does not require that the work-hardening take place at any particular temperature or at any specific stage of fabrication.

Moreover, had the phrase "work-hardened pseudoelastic metallurgical state" been intended to require that a component be subjected to work-hardening while in its pseudoelastic state, there would be no reason for claim 1 also to require that the component be "subjected to work-hardening", because a component in the work-hardened pseudoelastic metallurgical state would necessarily have been work-hardened. In other words, while it is redundant to require a frame component to be work-hardened at a particular temperature, and then in addition to require generally that the component be work-hardened, it is not redundant to require that a component be subjected to work-hardening during its fabrication and to require as well that the component still be in a work-hardened metallurgical state when completed. Thus, the inclusion of a work-hardening process limitation following the disputed phrase compels the conclusion that an alloy in the "work-hardened pseudoelastic metallurgical state" must exhibit residual work-hardening and pseudoelastic characteristics in its completed state, and not that the work-hardening must occur while the material is at a temperature in its pseudoelastic range.

The interpretation advanced by plaintiffs is also supported by the specification of the '955 patent. In describing the behavior of an alloy at temperatures between $M_s$ and $M_d$, the specification states that the alloy will behave as depicted in figure 2H of the patent, which is described by the inventors as representing work-hardened pseudoelasticity. 955:5:16-19. The specification states that "Figure 2H shows the

stress-strain behavior of a martensite alloy at $M_s < T < M_d$, ... which alloy has been work- hardened."[19] 955:3:51-54. Thus, the specification describes figure 2H as an example of the behavior of an alloy which is "work-hardened pseudoelastic" and states in addition that the alloy has been work-hardened. There is no indication in the specification, however, that the work-hardening must take place at any specific stage during processing. Thus, these passages in the '955 patent specification indicate that the disputed phrase is intended to describe the characteristics of a finished product rather than a step in its fabrication.

The expert testimony presented at trial also supports plaintiffs' interpretation. As noted above, it is proper for a court to rely upon expert testimony to explain the meaning of technical or scientific terms, or of terms of art used in patent claims. *Markman*, 52 F.3d 980-981. Because the phrase "work-hardened pseudoelastic metallurgical state" is clearly a term of art used by those knowledgeable about material sciences, it is appropriate for this Court to consider the expert testimony of Dr. Beshers, a professor of metallurgy and material science. When asked at trial to describe the meaning of the phrase "work-hardened pseudoelastic metallurgical state," Beshers testified that

> [t]he term 'state' at the end refers to the condition or state of the material ... It need not be attained in the same way all the time ... that state is work-hardened; that is, the structure has been changed by applying forces to it to produce the work hardened state and in the work hardened state it exhibits the pseudoelastic characteristics which we said goes with shape-memory alloys in a certain temperature range. Tr. 972. Beshers was then

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[19] T is used in the specifications of the suit patents to refer to the temperature of a shape memory alloy.

> asked to interpret the phrase "having been subjected to work-hardening." Beshers stated that, as he testified with respect to the phrase "work-hardened pseudoelastic metallurgical state," that "there's an implication in state, perhaps there may be more than one way to arrive at that final state, but [the phrase 'having been subjected to work-hardening'] now says clearly some work hardening is to be included in the process that leads to the final state."

Tr. 972. Beshers testified specifically that it was not necessary to work-harden material that is already in the pseudoelastic state to achieve the properties depicted in figure 2H of the patent, which as discussed above is described in the patent specification as "work-hardened pseudoelastic." Tr. 1095:22-1096:10. (Defendants' material science expert, Walter Johnson, did not testify about the proper interpretation of the disputed phrase.)

Defendants assert that the prosecution history supports their position, and point to several statements made by the inventors to the PTO indicating that desired properties can be achieved by work hardening an alloy while the alloy is in its pseudoelastic state. *See* PX 3, plaintiff CVI/Beta's Request for Reexamination, at 6 (stating that a "component *work-hardened in the pseudoelastic state* provides a desirable degree of comfort of wearing ...,") and at 10 (distinguishing the patented invention from prior art by stating that "the work-hardening occurs at a different temperature relative to its transformation temperature, i.e., it occurs on martensitic material as opposed to the inventive material which is *work-hardened* in its *pseudoelastic state*") (emphasis in original); DX 16, Second Preliminary Amendment to '955 Patent, at 2 (stating that work-hardened pseudoelastic metallurgical state, also referred to as optimized elastic, "is due to the work hardening of a pseudoelastic material").

Other portions of the prosecution history, however, support the claim construction advanced by plaintiffs. In their Second Preliminary Amendment, for example, the inventors asserted that they were attempting to make it clear that claim 1 describes a frame in the work hardened pseudoelastic state which has been "subjected generally" to work-hardening. DX 16 at 2. The use of the word "generally" suggests that the work-hardening need not be performed while the alloy is in its pseudoelastic state.

In any event, the claim language is clear and unambiguous and supported by the specification of the '955 patent and the expert testimony at trial. Moreover, the patent examiner did not require the inventors to amend claim 1 to require specifically that work-hardening take place at a point during fabrication at which an alloy is in its pseudoelastic metallurgical state. Accordingly, the prosecution history references on which defendants rely do not compel the construction of the claim language they advance.

For these reasons, the Court declines to construe the phrase "work-hardened pseudoelastic metallurgical state" to require, as defendants urge, that the work-hardening processing step occur while the component is in its pseudoelastic state. Rather, the Court construes the claim language in dispute to require only that the finished component possess a metallurgical structure showing residual work-hardening and, within the appropriate temperature range, exhibit pseudoelastic behavior.

**B. Sufficiency of the Evidence**

Defendants assert that the evidence at trial was insufficient to allow the jury to conclude that the accused frame components were in the "work-hardened pseudoelastic metallurgical state," as claim 1 of the '955 patent requires. Defendants' argument is premised upon a construction of the

claim which, for the reasons discussed above, the Court has rejected. Accordingly, defendants' motion in this regard must be denied.

Defendants further contend that the evidence at trial was insufficient to support the jury's finding that the work-hardening requirement of Claim 1 of the '112 patent was infringed. The '112 patent claims a frame having a portion that has been "subjected to at least 30% work-hardening." 112:12:17-18. Having failed to move for judgment as a matter of law on this ground during the trial, defendants are barred from raising this issue now. Fed. R. Civ. P. 50. Moreover, defendants' contention should be rejected on its merits.

As discussed above, whether an accused product is covered by the claims of a patent is properly resolved by a jury. *See Read Corp. v. Portec, Inc.*, 970 F.2d 816, 822 (Fed. Cir. 1992) (*citing Winans v. Denmead*, 56 U.S. 330, 338 (15 How. 330), 14 L.Ed. 717 (1854)). To overturn a jury verdict, a party must demonstrate that the jury's factual findings were not supported by substantial evidence. *Id.* at 821. This "raises the question of whether the jury's resolution of a factual dispute was reasonable." *Id.*

Plaintiffs' proof that the work-hardening requirement of Claim 1 of the '112 patent was infringed was presented by Dr. Beshers, who described the results of his testing and examination of the accused frame components. Defendants assert that this evidence was insufficient for two reasons. First, defendants contend that Beshers' results were based on several assumptions, rendering his results entirely speculative. Second, with respect to Turaflex frame Models 841, 868, 869, 870, 871 and 877, defendants argue that Beshers' tests revealed that these frames were subjected to less than the 30% work-hardening required by claim 1.

At trial, Dr. Beshers described the method by which he measured the allegedly infringing Turaflex frame components to determine whether they satisfied the work-hardening requirement of Claim 1 of the '112 patent. Beshers stated that he calculated the percentage of work-hardening to which a particular component had been subjected from its geometry, and that any assumptions he made were conservative ones. Tr. 1023-25.

Beshers' test results were summarized in a chart which was admitted into evidence as PX 32A. As defendants point out, although the six frames with allegedly infringing temples were each found to have been work-hardened in excess of 30%, the three models with allegedly infringing brows were calculated to have been work-hardened from 23% to 28%. As stated above, however, Beshers testified that his results were based on the most conservative assumptions possible, and opined that the Turaflex model frames at issue each infringed the 30% work-hardening requirement of Claim 1 of the '112 patent. *See* PX 439. Defendants' expert, Walter Johnson, did not render an opinion regarding the 30% work-hardening requirement. Accordingly, a reasonable juror could have concluded, from Beshers' testimony and the conservative assumptions on which it was based, that it was more likely than not that the Turaflex frames met the work-hardening requirement of the '112 patent. Defendants' motion in this regard must therefore be denied.

VI. ***Jury Findings Under the Doctrine of Equivalents***

The jury found that two accused frame components infringed certain claims of the suit patents pursuant to the doctrine of equivalents. Defendants assert that the evidence of equivalency presented at trial was insufficient, that plaintiffs failed to establish the validity of the claimed equivalents over prior art, and that the jury should not have been permitted to consider infringement under the doctrine of

equivalents without a preliminary finding by the Court that equitable considerations warranted the doctrine's application.

Defendants' contention that a party seeking to rely upon the doctrine of equivalents must first establish inequitable conduct by the alleged infringer was recently rejected by the Federal Circuit. *Hilton Davis Chemical Co. v. Warner-Jenkinson Co., Inc.*, 62 F.3d 1512 (Fed. Cir. 1995). The Court in *Hilton Davis* further held that equivalency is a question of fact properly resolved by a jury, and that a trial court has no discretion with respect to application of the doctrine, but must instruct the jury on equivalents upon a patentee's proper demand. 62 F.3d at 1522.

A finding of infringement under the doctrine of equivalents may be premised upon evidence that the claimed and accused products perform substantially the same function or accomplish the same result in the same way. The applicability of the doctrine, however, is determined not by whether the function-way-result test has been satisfied, but rather by considering the "substantiality of the differences between the claimed and accused products." 62 F.3d at 1518.

The jury relied upon proof of equivalence to find that two accused products, Turaflex Models 841 and 878, infringed four claim elements. First, the jury found that Turaflex Model 841 infringed the 4% elasticity requirement of claim 1 of the '112 patent based on evidence indicating that the frame exhibited 3.75% elasticity. Second, the jury concluded that Model 841 possessed the 30,000 psi yield strength required in claim 5 of both the '112 and '955 patents based upon proof that Model 841 possessed a yield strength of 28,000 psi at -20°C and the required yield strength at higher temperatures. Third, with respect to the requirement in claim 5 that a component be subjected to a heat-treatment for at least one hour at a temperature not exceeding 400°C, the jury relied upon evidence that Model 841 was subjected to a heat

treatment at 450°C for forty minutes, and that Model 878 was subjected to a heat treatment at 430°C for more than one hour. Finally, the jury concluded that Model 878 infringed claim 5 of both suit patents based upon proof of 2.8%, rather than the required 3%, heat-recoverable shape-memory.

The jury's findings of infringement pursuant to the doctrine of equivalents are amply supported by the trial record. First, each finding concerns a claim limitation expressed in numerical terms and subject to objective testing or empirical proof. The jury might well have concluded that the discrepancies between the claimed and accused products were insignificant based upon the apparently minor differences between the requirements of the patent claims and the measured characteristics of the accused components.

Moreover, plaintiffs provided the jury with expert testimony which buttressed this logical inference of substantial similarity. For example, Beshers opined during cross-examination that a yield strength measurement of 28,000 psi essentially meets a requirement of 30,000 psi, particularly given the difficulty of measuring yield strength precisely. Tr. 1149-50. (In addition, as discussed in Point IV above, claim 5, properly construed, does not require a yield strength of 30,000 psi at temperatures as low as -20°C.)

As another example, the jury had a clear factual basis for concluding that the differences between the elasticity and heat recoverable shape memory required by the suit patents and that exhibited by Models 841 and 878 were not significant. Plaintiffs introduced a chart depicting the appearance of an eyeglass frame temple subjected to various strains. *See* PX 23. This chart illustrates that an eyeglass frame temple strained by 3.5% will be bent at an angle of approximately 180°, and that a temple strained by 5.25% will be bent at an angle of approximately 225°. Based upon this chart, a jury could readily conclude that a difference in strain of 1.75%

(the difference between 5.25% and 3.5%) results in a difference in angle of 45° (the difference between 225°and 180°). By simple arithmetic, then, a difference in strain of .25% — the difference between the 3.75% elasticity demonstrated by Model 841 at -20°C and the 4% elasticity required by claim 1 of the '112 patent — results in a difference in angle of less than 7°. Similarly, the .2% difference between the 2.8% heat-recoverable shape-memory exhibited by Model 878 and the 3% heat-recoverable shape-memory required by claim 5 of the suit patents would result in an even smaller difference in angle. Clearly, with recovery from strains resulting in bends of approximately 180° contemplated by the patent, a difference in angle of less than 7° might reasonably be considered by a jury to be insubstantial.

In addition, plaintiffs introduced two charts which summarized the evidence demonstrating that each of the accused frame components infringed each element of the claims of the suit patents. PX 438 and 439. Plaintiffs' reliance upon equivalent rather than literal proof of infringement is expressly noted at every relevant point on these charts. Beshers testified that each entry on these charts was accurate, and that the assertions of equivalence on the chart were fully justified. Tr. 1055-56. The jury had ample opportunity to evaluate Beshers' credentials and credibility, and might reasonably have given considerable weight to his testimony that the accused Turaflex frames behaved essentially as described in the claims of the suit patents.

Finally, the behavior of Models 841 and 878 at various temperatures was demonstrated for the jury by John Krumme, one of the inventors. Tr. 518-20, 524-26. During these demonstrations, the frames exhibited remarkable flexibility, elasticity and resistance to permanent deformation, which are the essential characteristics of the claimed invention.

The only claim term which the jury found was infringed under the doctrine of equivalents which is not discussed in detail above is the requirement in claim 5 that a frame component be subjected to a heat treatment at a temperature not exceeding 400° for not less than one hour. Obviously, this claim term involves a processing step rather than a characteristic of a finished product. Accordingly, it was not possible for plaintiffs to establish equivalency with test results or demonstrations. The jury's finding of infringement under the doctrine of equivalents, however, was amply supported by the similarity in the temperature and duration of the heat treatments to which Models 841 and 878 were subjected, Beshers' expert opinion that the heat treatments were equivalent, and the evidence establishing that these models exhibited the characteristics and behaviors described in the other terms of the patent claims.

In their final argument concerning the doctrine of equivalents, defendants argue that plaintiffs failed to prove that the claims of the suit patents, as broadened by application of the doctrine of equivalents, are valid over the prior art. The findings of equivalence, however, were based upon proof of behavior so similar to that described in the patent claims that it is difficult to imagine how the prior art could read upon the marginally broadened claims without rendering the claims of the suit patents themselves invalid. (The jury, of course, rejected defendants' claim that the patents in suit were invalid because rendered obvious by the prior art.)

Moreover, the primary characteristic of the claimed invention, and the thrust of the debate over prior art before the PTO and at trial, concerned the elasticity described by the patent claims. *See, e.g.*, PX 4, defendant Tura's Request for Reexamination, at 4 (asserting that the prior art "anticipates the 'greater than 3% elasticity' set forth in the patent"); tr. 2002-49 (emphasizing, through the testimony of defendants'

witness Natoshi Takezaki, that discussions between Takezaki and the inventors focused upon the extent to which alloys with highly elastic properties were known in the prior art). As noted above, Beshers' tests indicated that Model 841 exhibited 3.75% elasticity rather than the 4% required by claim 1 of the '112 patent. Claim 1 of the '955 patent, however, requires only 3% elasticity, and was found to be valid over the prior art by the patent office and by the jury.

For these reasons, there was ample evidence to support the jury's finding of infringement under the doctrine of equivalents, and this finding did not broaden the claims of the suit patents to the extent where they read upon the prior art. Accordingly, this aspect of defendant's motion for judgment as a matter of law is denied.

VII. *Presumptive Proof of Heat Treatment*

As discussed above, claim 5 of the '112 and '955 patents requires a heat treatment "at a temperature not exceeding 400°C for not less than one hour." Section 295 of Title 35 provides that, upon a showing that there is a substantial likelihood that an accused product was made by a patented process, and that plaintiff has made a reasonable effort to determine the process actually used but has been unable to do so, the accused product shall be presumed to have been made by the patented process. 35 U.S.C. § 295. With respect to certain frame components, the jury was instructed pursuant to Section 295 that they should presume, subject to proof to the contrary by the defendants, that the accused frames were subjected to the required heat treatment. Tr. 3274-75.

Defendants challenge the propriety of this instruction on several grounds. First, defendants argue that Section 295 applies only to pure process patent claims, and not to a hybrid patent in which the claimed invention is a product but the patent claims also include processing steps. Defendants

further contend that plaintiffs failed to make the showings required by Section 295 concerning the likelihood that the allegedly infringing product was made by the patented process, and the reasonableness of plaintiffs' efforts to determine the process actually used.

As defendants acknowledge, this issue was discussed at length during the charge conference held during the trial. Tr. 2949-50; 2972-73. No new arguments are raised by defendants in support of their motion for judgment as a matter of law. Accordingly, this aspect of defendants' motion is denied for the reasons stated during the charge conference, which are reflected in the cited portions of the trial record.

VIII. *Nickel-Titanium Based Alloys*

Claims 1 and 5 of the suit patents describe eyeglass frames fabricated from a nickel-titanium based alloy. Defendants contend that, based upon the prosecution history, this claim term should be construed to require the use of an alloy comprised entirely of nickel and titanium. Because the accused Turaflex frames were fabricated from alloys primarily but not exclusively comprised of nickel and titanium, defendants assert that these frames cannot be found to infringe the suit patents.

Defendants failed to seek judgment as a matter of law in this ground during trial and are, therefore, procedurally barred from raising the issue now. Moreover, the merits of defendants' argument were addressed in detail and rejected by this Court prior to trial. *See* Memorandum and Order dated November 21, 1994 at 53-63. Defendants have raised no new arguments and have pointed to no additional evidence in support of their pending motion for judgment as a matter of law. Accordingly, for the reasons previously stated in this Court's Memorandum and Order of November 21, 1994, this aspect of defendants' motion is denied.

## IX. *Enablement*

Defendants asserted at trial that the claims of the '112 and '955 patents are invalid pursuant to 35 U.S.C. § 112 for lack of enablement. Section 112 requires that a patent specification contain

> a written description of the claimed invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, to make and use the same.

The jury rejected defendants' contention that the specifications of the suit patents failed to meet the requirements of Section 112. Defendants now seek to set aside the jury's verdict as unsupported by the uncontradicted evidence at trial.

A patent is presumed to be valid, and a party challenging a patent's validity for failure to meet the enablement requirement of Section 112 bears the burden of establishing by clear and convincing evidence that the patent specification is not enabling. 35 U.S.C. § 282; *Morton Int'l, Inc. v. Cardinal Chem. Co.*, 5 F.3d 1464, 1469 (Fed. Cir. 1993); *Ralston Purina Co. v. Far-Mar-Co., Inc.*, 772 F.2d 1570, 1574 (Fed. Cir. 1985). The evidence presented at trial supports the jury's conclusion that defendants failed to meet their burden.

Defendants' proof that the patents in suit are not enabling consisted entirely of the testimony of Walter Johnson, their expert metallurgist. Johnson testified that, although he reviewed the specifications of the suit patents and attempted to follow them, he was unable to make the claimed invention.

Johnson's testimony was insufficient to satisfy defendants' burden of proof. First, Johnson's qualifications were unimpressive when compared to those of Dr. Beshers, and

were, moreover, largely irrelevant to the question of enablement. Although he obtained a bachelor's degree in metallurgy, Johnson was never awarded any graduate degrees in metallurgy or material science, and has never published any books or articles. Tr. 2219, 2224. Johnson had no experience with shape memory alloys before he was retained by defendants to work on this case, nor did he have any experience with or knowledge about manufacturing eyeglass frames. Tr. 2224-25. Section 112 requires that a patent specification explain how to make the claimed invention in terms which are understandable to one of ordinary skill in the art. Clearly, Johnson is not one of ordinary skill in the art of manufacturing eyeglass frames. For this reason alone, Johnson's inability to make the claimed invention is not clear and convincing proof that the specifications of the suit patents are not enabling.

Moreover, the evidence at trial demonstrated that Johnson's efforts to make the claimed invention were limited and flawed. First, Johnson did not begin his attempts to make the claimed invention until three weeks prior to trial. Defendants presented no evidence regarding the amount of time during that three-week period which Johnson devoted to attempting to fabricate a frame in accordance with the patent specifications. Tr. 2316-17. In addition, although Johnson acknowledged that the specifications describe several ways of making the claimed invention, he was forced to concede that he tried to make the patented frames in only one of the ways described, and that the particular example he attempted to follow was selected by counsel for the defendants. Tr. 2314-15. Johnson further acknowledged that the specifications of the suit patents, when discussing the selection of an appropriate alloy from which to fabricate the claimed invention, refer back to another patent, but that he neglected to consult the patent so referenced. Finally, Johnson conceded that, although the specifications indicate

that the material being used should be pressed to attain the proper shape, he did not have the equipment required for pressing, and so instead rolled the alloy through dyes to give it the right shape. While he insisted that pressing and rolling are similar processing steps, Johnson conceded that they are not identical. Tr. 2318-20.

In light of these deficiencies in Johnson's testimony, it was entirely proper for the jury to conclude that defendants failed to meet their burden of establishing lack of enablement by clear and convincing evidence. Defendants nevertheless assert that plaintiffs were required, in response to Johnson's testimony, to introduce independent evidence that the patent specifications are sufficiently enabling to meet the requirements of Section 112. *See* Def. Mem. at 85-86. As noted above, however, a defendant bears the burden of establishing the invalidity of a patent, and a plaintiff seeking to enforce the patent is therefore obliged to rebut the defendant's proof only once the defendant has met its burden. The defendants in this case have failed to meet their burden of proof, and plaintiffs, as a result, were not required to submit any evidence in rebuttal.

Finally, defendants point to several cases in which courts have held that enablement is a matter of law, and should be decided by the court. *See In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993); *In re Ziegler*, 992 F.2d 1197, 1200 (Fed. Cir. 1993). Defendants assert that this Court should therefore independently determine whether the patent specifications meet the enablement requirement of Section 112. Although the issue of enablement may be one of law, it is dependent on several factual questions which were appropriately submitted to the jury. *See In re Wright*, 999 F.2d at 1561 (stating that "[a]s a statutory requirement, enablement is a question of law that we review de novo; however we review for clear error any underlying facts found ... in rendering [the] enablement

determination."); *Quaker City Gear Works, Inc. v. Skil Corp.*, 747 F.2d 1446, 1453-54 (Fed. Cir. 1984) (recognizing that, while the issue of enablement is a matter of law, it may involve resolution of subsidiary questions of fact); *Newell Companies, Inc. v. Kenney Manufacturing Co.*, 864 F.2d 757, 765 (Fed. Cir. 1988) (stating that where the case turns on factual issues, the question of obviousness, also a matter of law, may be given to the jury with proper instructions), *cert. denied*, 493 U.S. 814, 110 S.Ct. 62, 107 L.Ed.2d 30 (1989).

Whether the question of enablement is reviewed de novo as a matter of law or evaluated for sufficiency of the evidence as a jury question, the same conclusion is reached. Johnson's testimony, for the reasons discussed above, is simply inadequate to demonstrate by clear and convincing evidence that the patents fail to meet the enablement requirement of Section 112. Accordingly, defendants' motion for judgment as a matter of law on the issue of enablement is denied.

## X. *Inducing Infringement*

The jury found defendants Arthur Brody and Brodart Co. liable for inducing the direct infringement of defendant Tura.[20] As 35 U.S.C. § 271(b) provides, a party who actively induces infringement of a patent is liable as an infringer. Defendants assert that the jury was improperly charged with respect to the level of intent necessary for inducement.

The jury was instructed that, to hold Brody and Brodart liable for inducing infringement, they first had to find that Tura directly infringed the suit patents, and next that Brody and Brodart "actively and knowingly" aided and abetted

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[20] Defendant Brody's motion to dismiss for lack of venue is discussed below in Point XII of this decision.

Tura's direct infringement. The jury was further charged that a verdict of inducement required a finding that the defendants specifically intended to encourage Tura's infringement, and not merely that they knew of it. This requirement was explained as imposing upon plaintiffs the burden to establish that Brody or Brodart knew or should have known that their conduct would induce Tura to commit the acts which the jury found to constitute direct infringement. Tr. 3276-77.

Defendants' challenge to the jury charge is primarily directed to a subsequent portion of the instruction, in which the jury was told that knowledge of an infringement controversy is sufficient to support a finding of knowing inducement to infringe. Defendants further assert that it was improper to tell the jury that they could consider whether Brodart or Brody had a good faith basis for believing that Tura's conduct was in fact not infringing, and that good faith reliance on advice of counsel could be considered in making this determination. Tr. 3277. Defendants contend that knowledge of an infringement controversy is insufficient to support a verdict of inducement, and that good faith reliance on advice of counsel is not merely a consideration, but instead compels a finding that inducement did not occur.

The jury charge on inducement in this case is fully supported by the holding and rationale in *Symbol Technologies v. Metrologic Instruments, Inc.*, 771 F.Supp. 1390 (D.N.J. 1991) The Court in *Symbol Technologies* held that knowledge of an infringement controversy is sufficient to support a finding of inducement, and that advice of counsel is irrelevant because specific intent to infringe is not necessary. 771 F.Supp. at 1404-05.

Although the precedent concerning the required intent for inducement is not entirely clear and consistent, the holding in *Symbol Technologies* finds ample support in recent decisions of the Federal Circuit. The Federal Circuit's decision in

*Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464 (Fed. Cir. 1990), has been frequently relied upon by courts attempting to analyze whether the intent necessary for a finding of inducement to infringe has been shown. The Court in *Hewlett-Packard* carefully articulated the required intent as follows:

> [W]e are of the opinion that proof of actual intent *to* cause the acts which constitute the infringement is a necessary prerequisite to finding active inducement.

909 F.2d at 1469 (emphasis added). As the cited language plainly indicates, the Court in *Hewlett-Packard* focused on the defendant's intent to induce the acts found to be infringing, and not on the defendant's intent to infringe the patent. *See also Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1579 (Fed. Cir. 1986) (noting that liability under Section 271(b) does not require conduct rising to the level of willful infringement); *Curtis Mfg. Co. v. Plasti-Clip Corp.*, 888 F.Supp. 1212, 1222-25 (D.N.H. 1994); *Maxwell v. K Mart*, 880 F.Supp. 682, 685 (D. Minn. 1995). *Cf. Manville Sales Corp. v. Paramount Sys., Inc.*, 917 F.2d 544, 553 (Fed. Cir. 1990) (holding that a plaintiff seeking to establish inducement to infringe must show that the alleged infringer's actions induced infringing acts and that "he knew or should have known his actions would induce actual infringements"); *Dynamis, Inc. v. Leepoxy Plastics, Inc.*, 831 F.Supp. 651, 656-57 (N.D. Ind. 1993) (relying on the cited portion of *Hewlett-Packard* and holding that inducement to infringe requires "actual knowledge of the patent and the infringement").

The holding in *Symbol Technologies* flows logically from the case law and legislative history leading up to the passage in 1952 of 35 U.S.C. § 271, which are discussed by the Court in *Hewlett-Packard*. Prior to the Patent Act of 1952, liability for infringement was analyzed by courts "under a

theory of joint tortfeasance," and a party who caused or aided and abetted the commission of another's infringing acts was held jointly liable with the primary infringer or tort-feasor. *Hewlett-Packard*, 909 F.2d at 1469. The legislative history leading up to the enactment of Section 271 indicates that the statute was not intended to change the state of the substantive law, but merely to codify it. *Id.* Thus, it remains appropriate to consider inducement to infringe as a form of joint tortfeasance.

The level of intent required before liability may be imposed upon a primary tortfeasor applies as well to one who aids and abets or causes another to commit a tort. *See, e.g.*, Restatement (Second) of Torts, § 876, especially at Comments a and e. As the Federal Circuit has recently reiterated, intent is not an element of infringement, and only becomes relevant "when a patent owner seeks enhanced damages or attorney fees." *Hilton Davis*, 62 F.3d at 1519, 1523.

For the reasons stated above, I conclude that inducement does not require intent to cause another to infringe a patent, but focuses instead upon the intent to cause another to commit acts which constitute patent infringement. Accordingly, it was proper to instruct the jury that knowledge of an infringement controversy is sufficient to establish liability, and that an assertion of good faith reliance on advice of counsel may be considered, but is not necessarily dispositive.

## XI. *Damages*

Defendants raise three distinct challenges to the amount of damages awarded to plaintiffs by the jury. Each is discussed below.

## A. Proof Regarding Marchon Frames

At defendants' request, the jury was instructed that plaintiff Marchon, to recover damages for lost profits, "must demonstrate that its frames are covered by the suit patent claims." Tr. 3280. The jury verdict included an award to Marchon of lost profits in the amount of $12,585,093.

Defendants contend that Marchon is not entitled to damages for lost profits because the evidence at trial was insufficient to establish that Marchon's own frames are covered by the suit patents. Defendants assert in this regard that Marchon failed to prove that its eyeglass frames meet several elements of claims 1 and 5 of the suit patents. As defendants acknowledge, however, there is no requirement that a plaintiff's product meet more than one of the claims of the patents in suit before the plaintiff may recover damages for infringement. Accordingly, defendants assertions with respect to claim 5 need not be addressed, provided the evidence at trial was sufficient to allow the jury to conclude, as it did, that Marchon's frames are covered by claim 1 of the '112 and '955 patents.

Defendants contend that the proof at trial was insufficient to establish that Marchon's frames meet the terms of claim 1 in two respects. First, defendants assert that Marchon failed to establish that its frames are in the "work-hardened pseudoelastic state" as required by claim 1 of the '955 patent. This contention, however, is based upon the same claim construction advanced by defendants but rejected in Point V above, and therefore need not be given further consideration.

Defendants next assert that Marchon failed to establish that its frames were subjected to 30% work-hardening, as required by claim 1 of the '112 patent. In their two written motions for a directed verdict submitted during trial, however, defendants sought a directed verdict that none of the Marchon

frames are covered by claim 5 of the suit patents, but did not seek a similar ruling with respect to claim 1. Had they done so, Marchon would have had the opportunity to address any alleged deficiency in its proof.

Moreover, during his testimony at trial, Dr. Beshers, plaintiffs' expert, testified that he tested all of the Marchon frames in issue, and that all were covered by claim 1 of the '955 and '112 patents. Tr. 1056. Defendants correctly point out that plaintiffs did not introduce at trial any underlying documentation to support Dr. Beshers' conclusion that Marchon's frames had been subjected to 30% work-hardening. The jury, however, was entitled to rely on Beshers' conclusion without such documentation. In addition, Beshers explained that he calculated the percentage of work-hardening to which the defendants' frames had been subjected by examining the shape of the frame components in issue, and that the results he reached were minimum estimates. Tr. 964, 968, 978, 1042-43. The jury might well have compared the shape of the Marchon frames to the shape of defendants' frames and, particularly with no contradictory evidence presented by defendants to consider, concluded that the shapes of the frames were sufficiently similar to warrant an inference of comparable amounts of work-hardening.

Finally, in a decision rendered after the jury returned its verdict, the Federal Circuit has squarely held that a plaintiff in a patent suit is entitled to recover for all profits he would have made but for the defendant's infringement, including profits on sales of goods not covered by the suit patent. *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1546-49 (Fed. Cir.), *cert. denied*, — U.S. —, 116 S.Ct. 184, 133 L.Ed.2d 122 (1995). A consumer of eyeglass frames has no interest in the degree to which the frames were work-hardened during fabrication. Therefore, assuming that Marchon's frames meet all the elements of claim 1 of the '112 patent but for the

required percentage of work-hardening, the frames would clearly be an acceptable non-infringing substitute, but one available only from Marchon. Accordingly, Marchon would be entitled to damages for lost profits even if it were unable to establish that its frames were subjected to the percentage of work-hardening which claim 1 of the '112 patent requires. *See Rite-Hite*, 56 F.3d at 1548.

**B. Standing of Marcolin and Rothandberg**

Defendants next argue that plaintiffs Marcolin and Rothandberg lack standing as plaintiffs in this action. Defendants contend that the jury's damage award, to the extent that it includes compensation for profits lost by these two entities, should therefore be set aside.

Defendants moved to dismiss the claims asserted by Marcolin and Rothandberg prior to trial. Magistrate Judge Carter, to whom the motion had been referred, heard lengthy oral argument on December 17, 1992. During a status conference on April 19, 1993, Magistrate Judge Carter advised the parties that he would recommend that defendants' motion be denied for the reasons stated during the oral argument. Defendants did not file objections to Magistrate Judge Carter's recommendation. *See* Fed. R. Civ. P. 72(b). By Order dated September 14, 1993, United States District Judge Sterling Johnson, Jr., to whom this case was then assigned, adopted Magistrate Judge Carter's recommendation. No motion for reargument or reconsideration was filed. Only now, after the jury has awarded damages based upon profits lost by Rothandberg and Marcolin, do defendants seek to have the Court revisit this issue and rule that these entities lack standing to assert any rights pursuant to the suit patents.

In *Virgin Atlantic Airways v. National Mediation Board*, 956 F.2d 1245 (2d Cir.), *cert. denied*, 506 U.S. 820, 113

S.Ct. 67, 121 L.Ed.2d 34 (1992), the Court, reviewing the scope of the law of the case doctrine, noted that

> where litigants have once battled for the court's decision, they should neither be required, not without good reason permitted, to battle for it again.

956 F.2d at 1255 (quoting *Zdanok v. Glidden Co.*, 327 F.2d 944, 953 (2d Cir.), *cert. denied*, 377 U.S. 934, 84 S.Ct. 1338, 12 L.Ed.2d 298 (1964)). Reconsideration of a prior court order is generally granted only upon a showing that the applicable law has changed, that pertinent new evidence has been developed, or that the prior order was clearly erroneous or manifestly unjust. *Id.*

Defendants do not point to any new evidence or a change in the law warranting reconsideration. Instead, they simply restate the same arguments which were rejected by Magistrate Judge Carter and District Judge Johnson, presumably in an effort to demonstrate that Judges Carter and Johnson made decisions which were clearly erroneous.

Defendants first assert in this regard that Magistrate Judge Carter never made any findings or reached any conclusions before denying their motion to dismiss. *See* Mem. of Law in Support of Def.Mot. to Dismiss, dated Jan. 23, 1995, at 10. This is simply inaccurate. During the oral argument held on December 17, 1992, Judge Carter clearly articulated the factual basis for his decision. *See* Tr. of Oral Arg. at 12-14. Moreover, the reasoning underlying Judge Carter's decision is apparent from a reading of the entire oral argument transcript. Tr. 2-43.

In further support of their argument that the prior rulings of Magistrate Judge Carter and Judge Johnson were clearly erroneous, defendants rely on *Site Microsurgical Sys., Inc. v. Cooper Companies, Inc.*, 797 F.Supp. 333 (D. Del. 1992). The Court in *Site Microsurgical Systems* denied standing to a

parent company of a patent owner based upon the general principle that patent rights may be enforced only by a patentee or exclusive licensee. In doing so, however, the Court noted that the parent company had no involvement in the marketing of the patented technology, and that its only connection to the patent rights in issue was through corporate ownership. 797 F.Supp. at 338.

The facts in this case are readily distinguishable from those involved in *Site Microsurgical Systems*. Unlike the parent company in *Site*, Rothandberg and Marcolin were actively involved in marketing the eyeglass frames in issue under Marchon's direction and control. *See* Tr. of Oral Arg. at 10-15. In *Kalman v. Berlyn Corp.*, 914 F.2d 1473 (Fed. Cir. 1990), the Court held that a party which was neither a patentee nor an exclusive licensee had standing. In reaching this decision, the Court emphasized the "Congressional mandate that, in patent actions, ... the court shall award the claimant damages adequate to compensate for the infringement," and relied upon the close nexus between the patentee and the licensee with respect to the marketing of the patented item. *Kalman*, 914 F.2d at 1482. Particularly in light of *Kalman*, the decisions rendered by Magistrate Judge Carter and District Judge Johnson were not clearly erroneous. Accordingly, there is no reason to allow defendants to relitigate the question of standing, and this aspect of defendants' motion is denied.

**C. Attorney's Fees**

The jury awarded $1.5 million to Marchon in attorney's fees, and awarded $2.5 million to CVI/Beta, representing royalties withheld by Marchon to compensate Marchon for legal fees incurred in connection with this litigation. As plaintiffs acknowledge, these attorney's fee awards must be set aside.

## XII. *Defendant Brody's Motion to Dismiss for Lack of Venue*

Defendant Arthur Brody asserts that the claims against him should be dismissed because venue is not properly asserted over him in the Eastern District of New York. The sole and exclusive bases for venue in a patent infringement action are set forth in 28 U.S.C. § 1400(b), which states that

> [a]ny civil action for patent infringement may be brought in the judicial district where the defendant resides, or where the defendant has committed acts of infringement and has a regular and established place of business.

*See Fourco Glass Co. v. Transmirra Products Corp.*, 353 U.S. 222, 228, 77 S.Ct. 787, 792, 1 L.Ed.2d 786 (1957).

Under the first prong of Section 1400(b), venue properly lies where the defendant resides. Brody is a resident of California and does not maintain a residence in New York. *Brody Aff.*, ¶ 2.[21] Accordingly, plaintiffs must rely on the second basis for venue set forth in Section 1400(b) to demonstrate that venue as to Brody is proper in this district.

The second basis for venue requires a showing that a defendant has committed acts of infringement in the district, and that he maintains a regular and established place of business there. Plaintiff bears the burden of establishing both elements before venue can be found to be proper. *See Ipco Hosp. Supply Corp. v. Les Fils D'Auguste Maillefer S.A.*, 446 F.Supp. 206, 207-08 (S.D.N.Y.1978). Plaintiffs assert that Brody committed acts of infringement in this District by inducing defendant Tura to infringe the suit patents. In

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[21] "Brody Aff." refers to the affidavit of Arthur Brody dated June 2, 1992 and submitted in support of the defendants' motion to dismiss all claims against Brody for lack of venue.

particular, plaintiffs contend that the evidence developed during discovery and at trial establishes that Brody: (1) participated in discussions and attended directors meetings at Tura's facilities in the Eastern District of New York where Tura's strategy concerning the sale of Turaflex frames was discussed; (2) retained and met with counsel in New York to obtain advice about the Beta patents; and (3) used a New York apartment rented by Tura while he was "involved in the decisions concerning the infringing Turaflex frames." *Letter from plaintiffs' counsel, Edgar Haug, to the Court dated Jan. 16, 1995*, at 3.

The testimony relied on by plaintiffs, however, while indicating that Brody was present in this district on certain occasions, fails to establish any connection between his presence here and any infringing acts he may have committed or induced. For example, plaintiffs rely on the deposition testimony of Christopher Daly, excerpts of which were received into evidence during the trial. Plaintiffs assert that Daly's testimony establishes that Brody attended directors meetings in this district at which Tura's strategy for selling Turaflex frames was discussed. Daly, however, testified only that Tura Holdings, Inc. has annual directors meetings at the Tura facility in New York, and that Brody was present at some of these meetings. When questioned about the subject matter discussed at the meetings, Daly testified as follows:

> Q: So you went through all the minutes from 1987 to date and didn't find anything in those minutes which in any way related to this litigation or the Beta patents; is that correct?
>
> A: The only item that would have been relevant would have been the ratification of the management agreement. That's the only one I could recall.

Q: Do you recall this lawsuit ever being discussed at a directors' meeting of Tura Holdings?

A: Not specifically a directors' meeting, no.

Tr. 1231:4-12. Clearly, this testimony does not establish, as plaintiffs contend, that Brody attended any meeting in the Eastern District at which strategies for selling Turaflex frames were discussed, or that Brody engaged in any other conduct while attending directors meetings which constituted inducement to infringe.

Plaintiffs next assert that Brody used an apartment in this district provided by Tura while involved in making decisions about the infringing frames. Daly's testimony concerning the Tura apartment, however, consisted only of the following:

Q: What is the nature of th[e] compensation [received by Brodart for providing management services to Tura]?

A: It gets paid $15,000 a week for providing senior management services and as part of the agreement Tura provides an apartment for Brodart employees to live in when they come down to New York since Brodart does not have a New York location.

Q: Have you ever spent an evening in that apartment?

A: Yes, I have.

Q: Do you know if Mr. Brody has?

A: Yes, he has.

Tr. 1237:16-25. This testimony establishes only that Brody used a Tura apartment which is located in this district, a fact with no bearing on venue absent evidence demonstrating a connection between Brody's stays at the apartment and specific conduct on his part.

Plaintiffs were unable to develop any connection between Brody's stays at the Tura apartment and infringing acts when they deposed Brody during discovery. Although Brody did not testify at trial, he was questioned at his deposition about whether he had ever stayed at the Tura apartment. Brody acknowledged that he had stayed at the apartment on three occasions. *Brody Dep.* at 18-19, 402. When asked about his activities in New York after a night he may have stayed at the Tura apartment, however, Brody responded that he could not recall the purpose of his trip. *Brody Dep.* at 403. Because plaintiffs have adduced no evidence linking Brody's stays at the Tura apartment to any business discussion or activity, Brody's use of the apartment is insufficient to provide a basis for venue.

Perhaps the strongest evidence indicating that Brody committed acts of infringement in the Eastern District is Daly's testimony that Brody participated in two to six discussions regarding the Beta patents, and that a majority of these discussions took place at the Tura facility in this district. Daly, however, could recall only that Brody participated in these conferences either in person or by telephone. Tr. 1234-1235. When questioned about the subject matter of these discussions, Daly stated only that he was "brought up-to-date on the status of the case and the fact that there were some patents." Tr. 1233:25 — 1234:3. Daly was not asked whether any decisions regarding the Beta patents were made during these discussions, or whether Brody said or did anything during these discussions which may have induced Tura's infringement of the patents.

Inducement to infringe occurs when one actively and knowingly aids or abets another's infringement. *See Water Technologies Corp. v. Calco, Ltd.*, 850 F.2d 660, 668 (Fed. Cir.) *cert. denied*, 488 U.S. 968, 109 S.Ct. 498, 102 L.Ed.2d 534 (1988); *Symbol Technologies, Inc. v. Metrologic*

*Instruments, Inc.*, 771 F.Supp. 1390, 1404 (D.N.J. 1991). While planning or directing infringing acts committed in a district may suffice to render venue there proper, *see Kierulff Assoc. v. Luria Bros. & Co., Inc.*, 240 F.Supp. 640 (S.D.N.Y. 1965), Brody's mere participation in discussions about the status of this case or the existence of the Beta patents does not constitute active inducement to infringe. Without more specific evidence regarding the subject matter of the discussions in which Brody took part and Brody's contribution to those discussions, this Court cannot conclude that Brody aided or abetted Tura's infringement of the Beta patents during the conversations described by Daly.

When considered in its totality, the evidence relied upon by plaintiffs simply does not support an inference that Brody's inducing conduct must have taken place while Brody was in the Eastern District of New York. As noted above, Daly testified merely that Brody was present either by telephone or in person in this district for a "majority" of the two to six discussions regarding the Beta patents in which he participated. Moreover, Brody does not make frequent business trips to New York. In his affidavit, Brody states that he spends no more than ten days per year in New York, including the time he devotes to performing activities for Tura and for all other business and social purposes. *Brody Aff.*, ¶ 4. Similarly, at his deposition, Brody testified that he devotes less than 100 hours per year to business on behalf of Tura and that he makes between six and seven business trips per year to New York. *Brody Dep.* at 14-15. Given how infrequently Brody travels to New York, there is no reason to infer that he must have, or even that he probably, committed acts of inducement while he was in this district.

For these reasons, plaintiffs have failed to establish that Brody committed any acts of infringement in this district. Accordingly, the question of whether Brody has a regular and

established place of business in this district need not be reached.

As an alternative basis for venue, plaintiffs argue that Tura's residence and its infringing activities in the Eastern District of New York should be imputed to Brody because Brody's dominance of Tura renders him its alter ego. *See* Pl.'s Mem. of Law in Opp'n Mot. to Dismiss at 15-20; *Letter from Edgar Haug to the Court dated 12/16/94* at 7; *Letter from Edgar Haug to the Court dated 1/16/95* at n. 1. Under limited circumstances, it may be appropriate to pierce the corporate veil to establish venue in a patent action. *See Variable-Parameter Fixture Dev. Corp. v. Morpheus Lights Inc.*, 28 U.S.P.Q.2d 1239, 1993 WL 335027 (S.D.N.Y. 1993) (*citing Minnesota Mining & Manufacturing Co. v. Eco Chem, Inc.*, 757 F.2d 1256, 1265 (Fed. Cir. 1985)); *Kinetic Instruments, Inc. v. Lares*, 802 F.Supp. 976, 987 (S.D.N.Y. 1992). New York courts, however, "are reluctant to disregard the corporate entity." *William Wrigley Jr. Co. v. Waters*, 890 F.2d 594, 600 (2d Cir. 1989). A court should pierce the corporate veil and find a corporation's principal to be its alter ego only upon a showing that the corporate form has been used to commit a fraud, or "when it can be demonstrated that ... the corporation has been so dominated by an individual ... and its separate identity so disregarded, that it primarily transacted the dominator's business rather than its own." *Id.* (*citing Gartner v. Snyder*, 607 F.2d 582, 586 (2d Cir. 1979)). Plaintiffs point to no evidence which demonstrates either that Brody used the corporate form to perpetrate a fraud, or that Tura's corporate identity was disregarded and that it was primarily transacting Brody's business rather than its own.

Moreover, plaintiffs' reliance on *Variable-Parameter Fixture Dev. Corp.* and *Kinetic Instruments, Inc.* to support their assertion that Brody's dominance of Tura makes it his

alter-ego is misplaced. In both cases, the courts held that "piercing the corporate veil" may be warranted as a matter of equity because the corporation in issue was controlled by an individual defendant who siphoned corporate funds to prevent plaintiffs from collecting any judgment they obtained against the corporation. *See Variable-Parameter*, 28 U.S.P.Q.2d at 1240 (concluding that plaintiff established a prima facie case of alter ego by alleging that the corporate defendant's sole shareholder withdrew corporate funds which would have been available to satisfy a judgment after the litigation commenced); *Kinetic Instruments*, 802 F.Supp. at 986 (concluding that plaintiff established a prima facie case of alter ego by alleging that the dominant shareholder in the corporation advised plaintiff that he had taken steps to render the corporation unable to pay a judgment, and that piercing the corporate veil was therefore warranted to prevent fraud and injustice).

Plaintiffs here have failed to set forth any basis for piercing Tura's corporate veil. There has been no evidence that Brody has engaged in fraud, intermingled corporate and personal funds, undercapitalized the corporation, failed to maintain separate books and records or otherwise ignored corporate formalities, failed to pay dividends or permitted the corporation to engage in transactions while insolvent. *See*, *William Wrigley Jr. Co. v. Waters*, 890 F.2d at 600-01. Accordingly, Tura's residence and activities may not be imputed to Brody for the purposes of determining whether venue as to Brody is proper in this district.

Finally, plaintiffs argue that concerns for fairness and judicial economy warrant a finding that venue as to Brody is proper in this district. Although dismissal of this action against Brody may not be an efficient result, the Supreme Court has specifically held that Section 1400(b) must be strictly followed and not given a liberal construction guided

by policy considerations. *See Schnell v. Eckrich & Sons*, 365 U.S. 260, 262-64, 81 S.Ct. 557, 5 L.Ed.2d 546 (1961). If the requirements for venue under Section 1400(b) are not met, the Court is constrained to dismiss the action, even where the result is inefficient or unfair. *See Tolliver v. Edison*, No. G88-51CA1, 1988 U.S.Dist. LEXIS 17811 (W.D. Mich., June 24, 1988) (*citing* Schnell); *Toombs v. Goss*, 768 F.Supp. 62, 65 (W.D.N.Y. 1991) (stating that "[a] district court cannot dispense with the explicit patent venue requirement[s, even] in cases involving multiple defendants or conspiring defendants.").

Because plaintiffs have failed to demonstrate facts which would support venue under Section 1400(b), Brody's motion to dismiss for lack of venue is granted.

XIII. ***Defendants' Antitrust Counterclaims***

Defendants object to the entry of a final judgment in this action, asserting that they have brought counterclaims which remain unadjudicated. Defendants make this argument in a memorandum of law dated January 23, 1995, submitted to assert objections to a proposed form of final judgment which had previously been submitted to the Court by plaintiffs, and in a letter to the Court from David L. Harris, Esq., dated February 6, 1995.

The antitrust counterclaims which defendants assert are still pending were first raised in the form of proposed pleadings on the eve of trial. By motion dated November 18, 1994, defendant Tura sought leave to amend its amended counterclaims to assert new antitrust allegations. As defendants now acknowledge, the Court never formally granted this motion. *See* Defendants' Memorandum of Law dated January 23, 1995 at p. 5, n.1. Rather, defendants assert that Tura's motion to amend its amended counterclaims was implicitly granted by the Court in its Memorandum and

Order dated November 21, 1994. It is clear, however, from the Memorandum and Order as well as the conferences with counsel shortly before and after it was issued that defendants' motion was granted only to the extent of allowing Tura to assert a claim pursuant to *Walker Process Equip., Inc. v. Food Mach. and Chem. Corp.*, 382 U.S. 172, 86 S.Ct. 347, 15 L.Ed.2d 247 (1965), and that such a claim does not survive the jury's findings that the suit patents are valid and were infringed. *See* Memorandum and Order at 74-76.

Moreover, defendants' representations to the Court at and about the time they moved to amend their amended counterclaims clearly indicate that defendants were not seeking leave to assert any claims which did not depend upon a finding that the patents in suit were either invalid or not infringed. During oral argument on the motions which are addressed in the Memorandum and Order, held just slightly more than one month prior to trial, the Court asked the parties to consider bifurcating the trial of the plaintiffs' patent claims from that of defendants' antitrust counterclaims. In suggesting that bifurcation could potentially save judicial resources, the Court stated that

> clearly, if there's a finding of validity and infringement in the patent case your antitrust claims go down. You can't have an antitrust case ... if the jury finds for the plaintiffs on validity and infringement.

Tr. of Oct. 12, 1994 at 174. Defendant's counsel, Mr. Harris, responded, "I think that's right." Id. It is noteworthy in this regard that the parties and the Court were required to rely upon defendants' oral description of their claims, because defendants were withdrawing claims and altering their theories in the course of oral arguments made during the month prior to trial. Id. at 132.

The Court discussed the question of bifurcation with counsel again during a conference held on November 29, 1994, less than two weeks after the Memorandum and Order on which defendants rely was issued. In the course of debating the merits of bifurcation, defendants' counsel asserted that "I am not so sure I have an antitrust claim if this patent is found valid and infringed," to which the Court responded, "[r]ight." Tr. of Nov. 29, 1994 at 18. This exchange was the last discussion of defendant Tura's motion to amend its amended counterclaims before the jury returned its verdict.

As these representations by defendants' counsel make clear, it was understood by all parties and the Court that the only counterclaims which defendants were permitted to assert on the eve of trial depended upon findings of invalidity or non-infringement of the suit patents. The Court, in fact, relied upon defendants' representations in this regard in resolving the bifurcation issues raised during the oral argument on October 12, 1994. Only now, having the benefit of hindsight and in response to a jury verdict concluding that the suit patents are valid and were infringed, do defendants raise their "pending" antitrust counterclaims as an obstacle to the entry of final judgment.

For the reasons stated above, the Court concludes that there are no properly asserted counterclaims which remain unadjudicated. Accordingly, it is appropriate to enter final judgement on all claims asserted by the parties.

## XIV. *Terms of the Final Judgment*

Plaintiffs' counsel has submitted a proposed form of final judgment. Defendants, by memorandum dated January 23, 1995 and letter dated February 6, 1995, have challenged the propriety of several aspects of the proposed judgment.

The proposed judgment submitted by plaintiffs includes several paragraphs declaring that defendants have failed to establish the invalidity of the patents in suit. Defendants properly point out that these proposed paragraphs do not afford relief, and that the issues with which they are concerned are adequately addressed by a provision dismissing all affirmative defenses with prejudice. Accordingly, these provisions proposed by plaintiffs will not be included in the Court's final order.

Plaintiffs propose several provisions enjoining defendants from making, using or selling eyeglass frames with the characteristics described in the claims of the suit patents. In essence, plaintiffs propose a general injunction prohibiting further infringement of their patent rights. Such sweeping relief has been held to be unreasonably overbroad. *See KSM Fastening Sys., Inc. v. H.A. Jones Co., Inc.*, 776 F.2d 1522, 1526 (Fed. Cir. 1985); *see also, Hilton Davis Chem. Co.*, 62 F.3d at 1582 n. 39; *Additive Controls & Measurement Sys., Inc. v. Flowdata, Inc.*, 986 F.2d 476, 479-80 (Fed. Cir. 1993). Rather, injunctive relief should be limited to the particular devices found to infringe and any

> alteration in the device [which] is "merely colorable" and obviously was made for the purpose of evading the decree without essential change in the nature of the device.

*American Foundry & Mfg. Co. v. Josam Mfg. Co.*, 79 F.2d 116, 118 (8th Cir. 1935) (*quoting Radio Corporation of America v. Cable Radio Tube Corporation*, 66 F.2d 778, 782 (2d Cir. 1933)). Accordingly, the final judgment and order will prohibit defendants from making, using or selling the specific eyeglass frames found in this action to be infringing, or any frames which are similarly infringing because essentially identical to the specific models which were found by the jury to infringe.

Finally, the parties dispute the proper rate at which to compute prejudgment interest. Although a plaintiff prevailing in a patent action is generally entitled to an award of prejudgment interest, the rate and compounding of interest are matters of discretion for the Court. *See, General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 654-57, 103 S.Ct. 2058, 2062-63, 76 L.Ed.2d 211 (1983); *Rite-Hite*, 56 F.3d at 1555; *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 939 F.2d 1540, 1545 (Fed. Cir. 1991); *Bio-Rad Lab. v. Nicolet Instrument Corp.*, 807 F.2d 964 (Fed. Cir. 1986), *cert. denied*, 482 U.S. 915, 107 S.Ct. 3187, 96 L.Ed.2d 675 (1987); *Gyromat Corp. v. Champion Spark Plug Co.*, 735 F.2d 549, 556-57 (Fed. Cir. 1984).

Damages in an infringement case should ensure that a plaintiff is fully compensated. *General Motors*, 461 U.S. at 654, 103 S.Ct. at 2062; *Rite-Hite*, 56 F.3d at 1555. Accordingly, courts have frequently awarded compounded prejudgment interest at or about the prime rate. *See, e.g., Stryker Corp. v. Intermedics Orthopedics, Inc.*, 891 F.Supp. 751, 833 (E.D.N.Y. 1995); *Grain Processing Corp. v. American Maize-Products Co.*, 893 F.Supp. 1386, 1396 (N.D. Ind. 1995).

At trial, plaintiffs presented uncontroverted expert testimony that it would be reasonable to expect that a company such as plaintiff CVI/Beta would be required to pay one per cent above the prime rate to borrow funds. Tr. 1780. The same expert concluded, based upon a review of financial information pertaining to plaintiff Marchon, that Marchon was paying at or about the prime rate to borrow funds during the defendants' infringement. Tr. 1775; Plaintiffs' Ex. 440.25. Accordingly, interest will be computed on the damages awarded to plaintiff CVI/Beta at one percent above the prime rate, compounded annually, and on the damages awarded to Marchon at the following rates,

taken from plaintiffs' trial exhibit 440.25, compounded annually: for 1989, 11%; for 1990, 9.69%; for 1991, 8.75%; for 1992, 6.55%; for 1993, 6.06% and for 1994-1995, 6.20%.

## CONCLUSION

The Court will enter a final judgment and order consistent with this opinion.

## *JUDGMENT AND ORDER*

Judgment is entered on the jury's verdict in the Form of Special Verdict, rendered December 22, 1994 in this case, as follows:

1. U.S. Patents 4,772,112 and 4,896,955 are owned by Plaintiff CVI/Beta Ventures, Inc. and Plaintiff, Marchon Eyewear, Inc. is an exclusive licensee under those patents. Marchon Eyewear, Inc. exploits its exclusive license rights through its affiliated and controlled companies, Plaintiffs, Marcolin USA, Inc. and Rothandberg, Inc.

2. The claims of U.S. Patent No. 4,772,112 have not been proven invalid or unenforceable.

3. The claims of U.S. Patent No. 4,896,955 have not been proven invalid or unenforceable.

4. Defendant Tura L.P. has infringed the following claims of U.S. Patent 4,772,112 by sale of the following models of Turaflex eyeglass frames:

| *Turaflex Model* | *Claims Infringed*[1] |
|---|---|
| 841 | 1, 2, 5*, 6 |
| 868 | 1, 3 |

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[1] Elements of the claims marked with an asterisk were established pursuant to the doctrine of equivalents.

| | |
|---|---|
| 869 | 1, 2, 5, 6 |
| 870 | 1, 2 |
| 871 | 1, 3 |
| 874 | 1, 2 |
| 877 | 1, 3 |
| 878 | 1, 2, 5*, 6 |
| 879 | 1, 2, 5, 6 |

5. Defendant Tura L.P. has infringed the following claims of U.S. Patent 4,896,955 by sale of the following models of Turaflex eyeglass frames:

| *Turaflex Model* | *Claims Infringed*[2] |
|---|---|
| 841 | 1, 2, 5*, 6 |
| 868 | 1, 3 |
| 869 | 1, 2, 5, 6 |
| 870 | 1, 2 |
| 871 | 1, 3 |
| 874 | 1, 2 |
| 877 | 1, 3 |
| 878 | 1, 2, 5*, 6 |
| 879 | 1, 2, 5, 6 |

6. Defendant Brodart Co. has induced Tura LP to infringe U.S. Patents 4,772,112 and 4,896,955 and is therefore liable as an infringer.

7. Plaintiffs Marchon Eyewear, Inc., Marcolin USA, Inc. and Rothandberg, Inc. are collectively awarded damages, as against Defendants, Tura LP and Brodart Co., jointly and severally, in the following amounts:

| | |
|---|---|
| Lost profits for lost sales: | $ 2,944,024 |
| Lost profits for depressed prices: | $ 9,641,069 |

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[2] Elements of the claims marked with an asterisk were established pursuant to the doctrine of equivalents.

| | |
|---|---|
| **Total Marchon Damages:** | **$ 12,585,093** |

8. Plaintiffs Marchon Eyewear, Inc., Marcolin USA, Inc. and Rothandberg, Inc. are collectively awarded prejudgment interest at the following rates, compounded annually, calculated through the date of this judgment and order, as against Defendants, Tura LP and Brodart Co., jointly and severally: for 1989, 11%; for 1990, 9.69%; for 1991, 8.75%; for 1992, 6.55%; for 1993, 6.06% and for 1994-1995, 6.20%.

9. Plaintiff CVI/Beta, Ventures, Inc. is awarded damages, as against Defendants, Tura LP and Brodart Co., jointly and severally, in the following amounts:

| | |
|---|---|
| Royalty at 6% | $ 519,208 |
| Lump sum | $ 300,000 |
| **Total Beta Damages** | **$ 819,208** |

10. Plaintiff CVI/Beta, Ventures, Inc. is awarded prejudgment interest calculated at 1% above the prime rate, compounded annually, calculated through the date of this judgment and order, as against Defendants, Tura LP and Brodart Co., jointly and severally.

11. The infringement by Defendants Tura L.P. and Brodart Co. has not been proven to be willful.

12. Defendants' affirmative defenses are dismissed with prejudice.

13. Defendants' counterclaims are dismissed with prejudice.

14. Plaintiffs' claims against defendant Arthur Brody are dismissed without prejudice.

***ORDER FOR PERMANENT INJUNCTION AND ACCOUNTING***

15. Defendants Tura LP and Brodart Co., their attorneys, agents, successors, or any person or persons in privity with any of them who receives actual notice of this Order, are hereby permanently enjoined until September 20, 2005 from making, using, selling or offering for sale in the United States, or inducing others to make, use, sell or offer for sale, in the United States, Turaflex eyeglass frame Models 841, 868, 869, 870, 871, 874, 877, 878, 879, or other eyeglass frames essentially identical to the specific models found to infringe.

16. The foregoing injunction against Defendants shall take effect 48 hours after service of a copy of this Order upon attorneys for Defendants.

17. It is further ordered that Defendants Tura L.P. and Brodart Co., their attorneys, agents, successors and any person or persons in privity with any of them who receives actual notice of this Order, shall within 10 days of the date of this Order, deliver to Plaintiff Marchon Eyewear, Inc., at its place of business at 35 Hub Drive, Melville, New York, or to a representative designated by Marchon Eyewear, Inc., an inventory of all units of unsold Turaflex models 841, 868, 869, 870, 871, 874, 877, 878, and 879 and/or other nickel-titanium based shape-memory alloy frames in their possession, custody or control and specify the location at which such frames will be stored until the expiration of U.S. Patent No. 4,772,112 and 4,896,955 or otherwise disposed of consistent with the terms of this Judgment and Order.

18. It is further ordered that Defendants Tura L.P. and Brodart Co. shall, within 10 days of the date of this Order,

provide an accounting to Plaintiffs and to this Court of all sales of Turaflex frames models 841, 868, 869, 870, 871, 874, 877, 878, 879 sold since September 30, 1994.

19. This Court shall retain jurisdiction of this action for purposes of enforcement of the provisions of the foregoing Order and for supplementation of the Judgment to include damages for sales of infringing eyeglass frames sold from September 30, 1994 to the date of this Judgment and Order.

**SO ORDERED.**

## APPENDIX E

CVI/BETA VENTURES, INC., Plaintiff-Appellee, Marchon Eyewear, Inc., Marcolin USA, Inc., and Rothandberg, Inc., Plaintiffs-Appellees,

v.

TURA LP and Brodart Co., Defendants-Appellants, and Arthur Brody, Defendant, and Bracken Opticians, Defendant.

No. 96-1167.

United States Court of Appeals, Federal Circuit.

Aug. 13, 1997.

James J. Maune, Brumbaugh, Graves, Donohue & Raymond, New York City, for plaintiff-appellee CVI/BETA Ventures, Inc. Of counsel was David T. Cunningham.

Edgar H. Haug, Curtis, Morris & Safford, P.C., New York City, for plaintiffs- appellees Marchon Eyewear, Inc., Marcolin U.S.A., Inc. and Rothandberg, Inc. Of counsel were John R. Lane, Daniel G. Brown, and Yvonne K. Tran. Also of counsel were Robert J. Mathias, Piper & Marbury, L.L.P., Baltimore, MD, Robert J. Koch, Fulbright & Jaworski, L.L.P., Washington, DC, and Daniel J. Leffell, Paul, Weiss, Rifkind, Wharton, & Garrison, New York City.

Donald R. Dunner, Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P., Washington, DC, for defendants-appellants. Of counsel was Darrel C. Karl.

### ORDER

A combined petition for rehearing and suggestion for rehearing in banc having been filed by the APPELLEE, and

a response thereto having been invited by the court and filed the APPELLANT, and the petition for rehearing having been referred to the panel that heard the appeal, and thereafter the suggestion for rehearing in banc and response having been referred to the circuit judges authorized to request a poll whether to rehear the appeal in banc, and a poll having been requested, taken, and failed, it is

ORDERED that the petition for rehearing be, and the same hereby is, DENIED, and it is further

ORDERED that the suggestion for rehearing in banc be, and the same hereby is, DECLINED.

Circuit Judge MAYER dissents in a separate opinion.

MAYER, Circuit Judge, dissenting.

By denying CVI/BETA's suggestion for rehearing en banc, the court once again shows that we are solecists. We are not the only ones who use the law, and like our audience — the patent community, the district judges, and others — we are bound to interpret law according to specific rules. By violating these interpretive rules, or by exposing them to exceptions so that our court can amass decisionmaking authority without due deference to other actors in the process, we inappropriately encumber the process with ambiguity, which invites uncertainty in the law and which cannot help but to repay us with larger caseloads and disgruntled litigants.

In affirming the judgment of infringement in *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995), the Supreme Court chose not to reaffirm this court's majority opinion. *Markman v. Westview Instruments, Inc.*, — U.S. —, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). Instead, it divided the responsibilities for claim construction between actors according to well-established principles. The Court gave the trial judge the task of interpreting the scope of the

patent by examining the claims, the specification, the prosecution history, and extrinsic evidence. To the trial level fact finder, the Supreme Court left the task of evaluating extrinsic evidence to determine the scope and content of prior art and what a claim term would mean to one of ordinary skill in that art. To the appellate court, the Court allocated a much narrower task, reviewing the district court's claim construction. The Supreme Court in no way suggested that, where the district court found facts about the prior art or the skill and understanding of an artisan, the appellate panel could disregard these findings upon *de novo* review. Instead it called for the trial court and the appellate court each to work within its own field of expertise and with its own procedures.

Our adjudicatory system has redundant mechanisms to correct errors when and where they occur. At the trial level, for example, parties can object to proposed findings of fact and conclusions of law, they can move for judgment as a matter of law following a jury verdict, for reconsideration, or even for a new trial. As these options exhaust, the principle of finality engages in various ways so as to preclude further discussion. For each alleged error, a party is required to meet a predefined standard before the judicial system permits resurrection of the settled question. As an appellate court, we lack the trial devices and technical understanding to retry a patent case anew. Because we also lack the time, the familiarity with the facts, and the immersion in spoken and unspoken detail, technical and contextual, that occur during a trial, we are also more likely to assume that we can understand a claim term without resort to expert testimony about the existence and resolution of ambiguity in meaning. But we should not forget the warning of Socrates: it is a wise man who recognizes how little he knows.

A suggestion for rehearing en banc does not give parties a meaningful mechanism to protect themselves from the sort of appellate review contemplated by the court in this case. If read in conjunction with *Markman*, the denial order says that no deference is given to the factual findings of the trial court. In fairness ought we not permit parties to disengage the procedural locks that implement the principle of finality, so that additional discovery and testimony can be had on appeal? Shouldn't parties be able to test and object to the claim interpretations of the appellate panel?

When reviewing findings of fact, the appellate court affirms absent a showing that the district court committed clear error. These findings of fact are relevant only to the instant parties, and justice can be approached and disbursed without significant concern for consistency between opinions. However, when reviewing questions of law, which will prospectively influence the behavior of diverse parties and the courts, our system works to attain greater consistency between results. To achieve this consistency in law, we have the freedom to differ from, rather than defer to the court that we review. Between the two, where we must review determinations of law that are informed by the resolution of factual disputes, we must separate the two and give each its proper measure of respect. When we do otherwise, we 'deviate from the proper, normal and accepted order of our judicial duties, we are not consonant with logic, circumstance, known fact and other standards, our actions are improper, and if these were but guidelines instead of binding rules, we would be breaching etiquette and decorum.'* Save to augment the power of our court, no rational basis exists to deviate from every other area of appellate review, in which

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* This is a paraphrase of the definition of solecism found in *Webster's Third New International Dictionary* 2168 (1971).

we examine the factual findings of a district court only for clear error. To remedy this mistake and limit the role of the court to the review contemplated by the Supreme Court in *Markman v. Westview Instruments, Inc.*, — U.S. ----, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996), I believe rehearing en banc is necessary.

## APPENDIX F

CVI/BETA VENTURES, INC., Plaintiff-Appellee, and Marchon Eyewear, Inc., Marcolin U.S.A., Inc., and Rothandberg, Inc., Plaintiffs-Appellees,

v.

CUSTOM OPTICAL FRAMES, INC., Charles Dahan, Nissey Co., Ltd. and Kanto Special Steel Works, Ltd., Defendants-Appellants.

CVI/BETA VENTURES, INC., Plaintiff-Appellee, and Marchon Eyewear, Inc., Marcolin U.S.A., Inc., and Rothandberg, Inc., Plaintiffs-Appellees,

v.

CUSTOM OPTICAL FRAMES INC., Charles Dahan, Nissey Co., Ltd., and Kanto Special Steel Works, Ltd., Defendants-Appellants.

Nos. 96-1070, 95-1486.

United States Court of Appeals, Federal Circuit.
June 19, 1996.

D.Md.

AFFIRMED.

Before ARCHER, Chief Judge, NEWMAN, and MICHEL, Circuit Judges.

DECISION

ARCHER, Chief Judge.

Custom Optical Frames, Inc. et al. (collectively "Custom Optical") appeal the order of the United District Court for the

District of Maryland granting a preliminary injunction against Custom Optical in this action brought by CVI/Beta Ventures, Inc. et al. (collectively "CVI/Beta") for infringement of its United States Patent Nos. 4,772,112 (the '112 patent) and 4,896,955 (the '955 patent). Custom Optical separately appeals the district court's denial of its request to increase the amount of the injunction bond. We granted a stay of the injunction and consolidated these appeals for purposes of oral argument and disposition. We affirm both the grant of the preliminary injunction and the district court's refusal to increase the bond amount.

## DISCUSSION

The '112 and '955 patents[1] pertain to eyeglass frames made from nickel-titanium based shape-memory alloy which are resistant to permanent deformation. For purposes of the preliminary injunction and this appeal, only claim 1 of the '955 patent is at issue. Claim 1 is as follows:

An eyeglass frame having at least a portion thereof fabricated from nickel-titanium based shape-memory alloy, said portion being in the work-hardened pseudoelastic metallurgical state, said portion having been subjected to work-hardening and having a low effective elastic modulus giving a soft, springy feel, said portion having greater than 3% elasticity over a temperature range from -20°C to +40°C.

After considering the requisite factors, *i.e.*, the reasonable likelihood of success on the merits, irreparable harm, the balance of the hardships, and the impact on the public interest, *Hybritech, Inc. v. Abbott Labs.*, 849 F.2d 1446, 1451, 7 USPQ2d 1191, 1195 (Fed. Cir. 1988), the district

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[1] The application for the '955 patent was a continuation-in-part of the application for the '112 patent.

court determined that preliminary injunctive relief was warranted. Relevant for purposes of this appeal is the district court's determination that CVI/Beta showed a reasonable likelihood of success of proving infringement and, more specifically, its interpretation of two claim limitations favorable to CVI/Beta.

The district court looked at the limitation "said portion being in the work-hardened pseudoelastic metallurgical state," and determined that claim 1 was not limited to frames that are work-hardened while in the pseudoelastic metallurgical state. In addition, the district court interpreted the limitation requiring "greater than 3% elasticity" to mean that within the claimed temperature range the frame portion will recover at least 3% of its original shape after being subject to strain, rather than meaning that it must show complete recovery after a strain of greater than 3%. The district court enjoined Custom Optical from further infringing the '955 patent and required CVI/Beta to post a bond in the amount of $500,000.

The decision to grant a preliminary injunction is within the discretion of the district court, and, as a result, we review that decision for an abuse of discretion. *Novo Nordisk of N. America, Inc. v. Genentech, Inc.*, 77 F.3d 1364, 1367, 37 USPQ2d 1773, 1775 (Fed. Cir. 1996). "An abuse of discretion may be established by showing that the court made a clear error of judgment in weighing relevant factors or exercised its discretion based upon an error of law or clearly erroneous factual findings." *Id.*, 37 USPQ2d at 1775; *Joy Technologies, Inc. v. Flakt, Inc.*, 6 F.3d 770, 772, 28 USPQ2d 1378, 1380 (Fed. Cir. 1993).

Custom Optical argues that the phrase "work-hardened pseudoelastic metallurgical state" limits claim 1 to frames which are pseudoelastic while they are work-hardened. In support, it cites statements made during the prosecution of the applications resulting in the '955 and '112 patents.

Particularly, Custom Optical asserts that, as a result of CVI/Beta's statement that claim 1 recites "limitations which are proper to use in an article that is defined by process of manufacture," claim 1 is limited to a product by process.

After considering all of Custom Optical's arguments, we conclude that Custom Optical has not established that the district court erred in construing claim 1 as not necessarily being limited to work-hardening in the pseudoelastic state. By its own terms, "in the work-hardened psuedoelastic metallurgic state" describes a state, not a process. In contrast, the very next limitation in claim 1, "said portion having been subject to work-hardening," describes a process. Thus, claim 1 does recite a process component, and CVI/Beta's statement during prosecution is not inconsistent with the district court's interpretation. Moreover, interpreting "work-hardened pseudoelastic metallurgic state" as a process limitation appears to make this later process limitation redundant. Thus, Custom Optical has failed to show that during prosecution CVI/Beta converted this state of matter limitation into another process limitation.

As to the 3% elasticity requirement, Custom Optical asserts that this limitation only covers frames which completely recover from a strain of 3%. It cites a dictionary definition stating that elastic behavior is the recovery of the original dimensions of a deformed body when the load is removed and argues that claim 1 is directed to the embodiment shown in Figures 2F and 2H depicting optimized elasticity or complete recovery. These figures, however, are described in the specification as representing ideal characteristics. Nowhere in the specification, claims, or prosecution history, however, does CVI/Beta indicate that it was limiting the claim to complete recovery. To the contrary, where the phrase "elasticity" is used, it is not in the context of complete recovery. For example, in connection with another

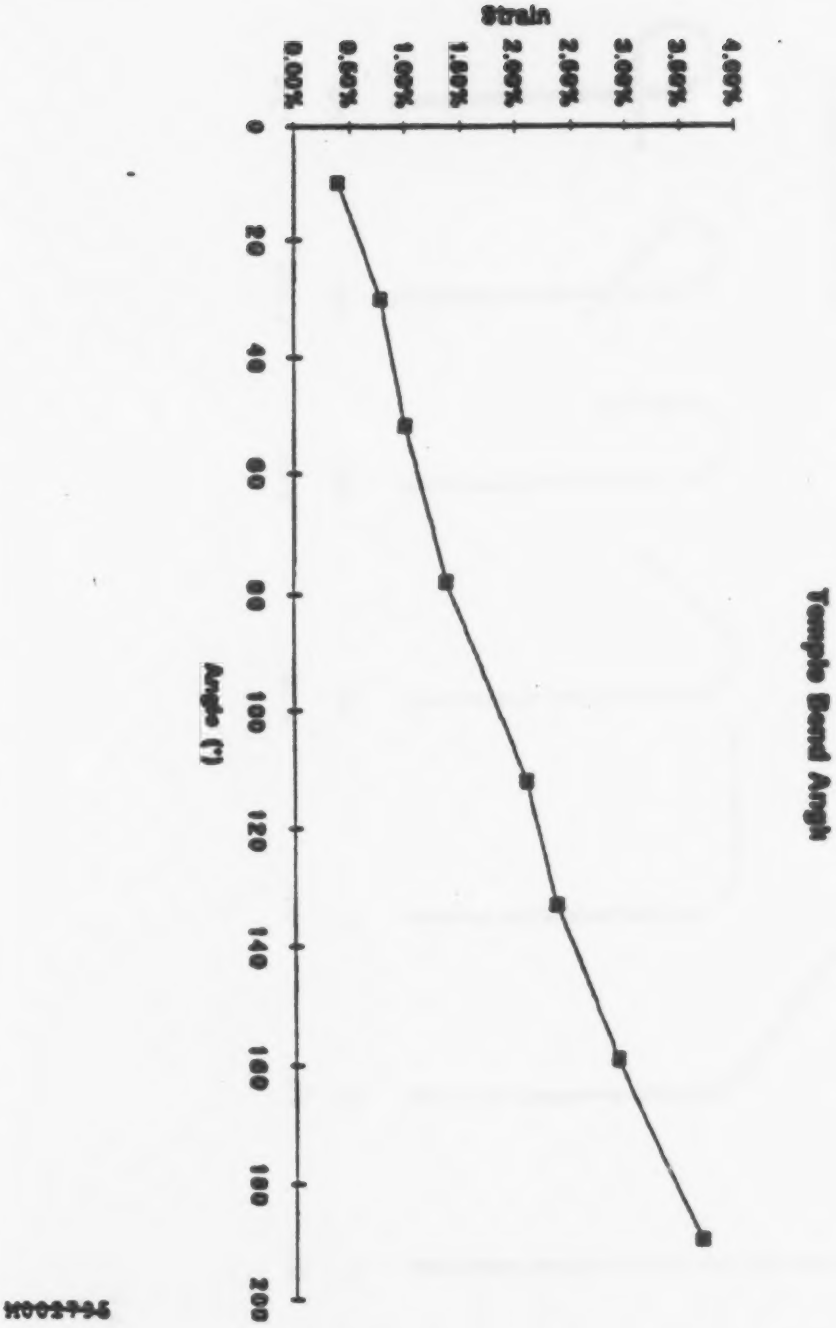
embodiment the remaining deformation is recovered through heat. Custom Optical has failed to show that this term means different things when referring to different embodiments.

Accordingly, we cannot conclude in the context of the preliminary injunction proceedings that the district court erred in rejecting Custom Optical's proffered claim interpretation. Custom Optical has failed to show that its claim interpretation is correct as a matter of law. Because the evidence before the district court shows that the accused frames are work-hardened and pseudoelastic and recovered at least 3% of their original shape when strained, the district court's conclusion that CVI/Beta was reasonably likely to succeed in showing infringement was not based on an error of law or clearly erroneous factual findings. In addition, we have considered Custom Optical's remaining arguments, and find them insufficient to show that the district court abused its discretion. As this court noted in *PPG Indus. v. Guardian Indus.*, 75 F.3d 1558, 1567, 37 USPQ2d 1618, 1626 (Fed. Cir. 1996), Custom Optical "will have an opportunity at the merits stage to present and expand upon the arguments it has made at the preliminary injunction stage, as well as any additional arguments that it chooses to present, and the district court will be able to give those arguments plenary consideration at that time."

Finally, we consider Custom Optical's challenge to the amount of the injunction bond. Under Rule 65(c) of the Federal Rules of Civil Procedure, upon the issuance of a preliminary injunction, the court is required to obtain security "in such sum as the court deems proper, for payment of such costs and damages as may be incurred or suffered by any party who is found to have been wrongfully enjoined or restrained." The district court determined based on the facts

before it, including the fact that Custom Optical's claimed damages were either speculative and remote or grossly overstated, that an injunction bond in the amount of $500,000 would be proper. Custom Optical has failed to show that this determination amounts to an abuse of discretion.

In view of the above, this court's order dated November 29, 1995 granting Custom Optical's motion for a stay, pending appeal, of the preliminary injunction issued by the district court is vacated and the preliminary injunction against Custom Optical is reinstated effective on the date of this opinion.


Strain
0.00%
0.50%
1.00%
1.50%
2.00%
2.50%
3.00%
3.50%
4.00%
Angle (°)
0
20
40
60
80
100
120
140
160
180
200
Tensile Bend Angle

A 7233

P-23

A 7236

BEST AVAILABLE COPY

Approximate strain level vs. angle of deflection
for a temple (1mm section).

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PROTECTIVE ORDER

| Degrees | 0 | 45 | 90 | 135 | 180 | 225 | 270 |
|---|---|---|---|---|---|---|---|
| Strain | 0% | 1% | 1.5% | 2.5% | 3.5% | 5.25% | 7.5% |